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Report of a Survey of the Public Schools of Leavenworth, Kansas

BUREAU OF EDUCATIONAL MEASUREMENTS AND STANDARDS

Entered as second-class mail matter in the post office at Emporia, Kan.

Vol. IV New Series No. 2

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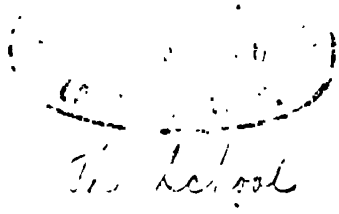

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REPORT OF A SURVEY OF THE PUBLIC SCHOOLS OF LEAVENWORTH, KAN.

A survey conducted under the auspices of the Kansas State Normal School.

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THE BUREAU OF EDUCATIONAL MEASUREMENTS AND STANDARDS.

IT IS RECOGNIZED that the product of instruction in school is complex; that it at least consists of habits, knowledge, and ideals. At present we have no instruments for measuring ideals or knowledge, but we do have several instruments which can be used to measure certain specific habits; *e. g.*, the Courtis tests in arithmetic, the handwriting scales of Ayres and Thorndike, the spelling tests of Buckingham and Ayres, the drawing scale of Thorndike.

To measure the *habit* portion of the product of instruction does not mean that knowledge and ideals are considered less important. The latter are not measured simply because, as stated above, educational experts have not discovered a means of doing the work.

In order that the schools of Kansas might have a central place where tests like those mentioned above could be secured and results compiled, the State Board of Administration established at the Kansas State Normal School the Bureau of Educational Measurements and Standards. The character and work of the bureau may be stated as follows:

1. It is to be a *state* bureau.
2. The work of the bureau must be coöperative.
   The Kansas State Normal School will provide expert direction and clerical assistance. The superintendents and teachers of the state can furnish information, etc.
3. The function is—
   a. To make accessible to the superintendents and teachers of Kansas tests and scales.
   b. To establish *Kansas* standards.
   c. To devise new tests.
   d. To investigate problems of school administration and provide comparative data for the use of superintendents and boards of education.
4. Although this bureau has been established recently, this type of work was begun by the Kansas State Normal School over a year ago. This year (1914-'15) the Courtis tests have been made accessible to the superintendents. An algebra test and a silent reading test have been devised. The cost of instruction in high schools and retardation in elementary schools are being investigated.
5. The work of the bureau will be published.
6. Similar bureaus or departments have been established in nine cities of the United States, and in less than that number of colleges and universities.

School surveys represent one form in which measurement is being applied to school systems.

The survey of the Leavenworth Public Schools was made by members of the faculty of the Kansas State Normal School, together with other educational experts for whose contribution to the success of the survey this institution desires to express its appreciation.

This report is published because it contains, it is believed, much material sufficiently general to make it of value to superintendents and boards of education throughout the state.

THOMAS W. BUTCHER,
President Kansas State Normal School.

EMPORIA, KAN., November, 1915.

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Report of a Survey of the Leavenworth Public Schools, Leavenworth, Kansas.

PREFATORY STATEMENT.

Walter S. Monroe, Director of Survey.

THIS Survey was initiated by the superintendent and teachers of Leavenworth. An executive committee was selected and a fund sufficient for defraying the expenses of those engaged in the work was raised by contributions from the teachers and Board of Education. The Executive Committee invited the Kansas State Normal School to assume the responsibility of the Survey. In consultation with the Executive Committee, the Survey Staff were selected by the Director of the Survey and the assignments of sections of the report were made to the members of the Survey Staff. In this final report these sections appear under the name of the member to whom they were assigned.

DATE OF THE SURVEY.

The work of the Survey began with a visit by Dr. Charters, Dr. Smith, Miss Porter and myself to Leavenworth, January 21-23, 1914. The work done on this visit was of a preliminary nature. Within the period from February 10 to 15 I visited Dr. Charters, Dr. Bagley and Dr. Bobbitt, who went over with me the plans which had been made for the Survey. February 22 and 23 I again visited Leavenworth in company with Dr. Bobbitt. Dr. Smith, Miss Porter and I were in Leavenworth from March 7 to 21, Miss Cooke from March 15 to 21, Miss Dobbs from March 17 to 21. And finally Dr. Bagley, Dr. Smith, Miss Porter and I spent April 9 to 13 in Leavenworth. In addition, during the week of May 10 to 16, I again visited Dr. Charters and Dr. Bobbitt, who went over a preliminary draft of the report with me, and I also visited Miss Dobbs and Miss Cooke and discussed with them their sections of the report.

COÖPERATION.

While the Survey Staff were all together at Leavenworth in March, frequent conferences were held and preliminary drafts of several of the sections were read and discussed. We found a surprising agreement on the points of excellence and criticism and on the recommendations for improvement. In addition, the three members of the Staff who reside in Emporia have been in constant communication, and together have gone over the entire report. Thus, although the sections of this report appear as the work of individuals, they represent in a very great degree the combined judgment of the entire Staff.

The report represents a coöperative enterprise. Practically all of the data relating to buildings and material equipment and many other items were collected by the superintendent with the assistance of the teachers. The tests were given by the principals and teachers, and most of the

clerical work, except the typewriting, was done by substitute teachers. The manuscript of the report has been read and criticised by the superintendent and teachers.

RECENT IMPROVEMENTS.

A school system may be judged not only by its present status but also by its present tendency. What it is is scarcely more important than the spirit which shows what it is to become. That the progressive spirit is abroad in the Leavenworth Public Schools is shown by the fact that within the last few years several important improvements have been made. A few of the more significant are:

1. Departmental instruction has been introduced in the upper grades.
2. Supervisors have been added to the teaching staff, particularly in physical-training, music, and arts and crafts.
3. Manual training and domestic science have been added to the program of studies in both the elementary school and the High School.
4. A splendid system of records has been introduced.
5. A beginning has been made in acquiring playground apparatus and more attention is being given to playground supervision.
6. Several parent-teacher associations have made a healthy beginning.
7. Several valuable readjustments have been made in the curriculum, *e. g.*, less formal grammar is taught.

The last two of these improvements belong to the present year. A number of others are planned for the coming school year.

A more important index of the progressive spirit than the specific facts mentioned is that a comprehensive survey of the public schools has been inaugurated by the teachers, and in a large part financed by them. Thus the schools have willingly been subjected to such scientific measurements as were available, and data have been secured which can be used as the basis of future plans for improvement. All these facts, together with many others, show that the Leavenworth Public Schools are rapidly increasing in efficiency and a broad foundation is being made for continuous improvement.

The existence of a weakness or fault in a school system is not necessarily a criticism of the superintendent, principals or teachers. It may be due to tradition, to unavoidable conditions, or to the community, and perhaps the weakness or fault has already been recognized and the condition is being improved as rapidly as possible. This is certainly true in several instances in the Leavenworth Public Schools.

Some of the recommendations and suggestions appearing in the following chapters must be considered as ideals which will be approached slowly. On the other hand, others are capable of relatively immediate realization. Probably no greater disaster could grow out of this Survey than that it should lead to an immediate attempt to inaugurate and realize all the recommendations made. Careful thought must precede all changes, and improvements will come slowly. It is necessary always to keep in mind that a high degree of efficiency in public-school work involves several factors.

THE PURPOSE OF A SURVEY.

The purpose of a survey of a school system is to stimulate and assist in its future development by revealing existing conditions, recommending plans for enlarging the service to the community, and for increasing the efficiency of the present activities of the school system. The bases for making recommendations are two: First, general principles of education; second, the defects in the present educational practice within the system.

In order that the recommendations may be understood it is necessary to state the principles and the present conditions which form the basis of the recommendations. This frequently requires that considerable prominence be piven to the present defects of the school system under consideration.

On behalf of my associates and myself, I wish to express our appreciation of the courteous and helpful assistance which was received at the hands of Superintendent Moore, the principals, the teachers, and the Board of Education. The members of the Survey Staff desire to express their appreciation of the generous assistance which has been given by those acting in the capacity of advisory experts.

CHAPTER I.

A GENERAL VIEW OF LEAVENWORTH.

Walter R. Smith.

EVERY institution has its social background. If an organization is to be effective it must not only be adapted to the end in view, but it must be adapted to the people who are to run it. The school is an institution which has been created by society for the definite purpose of training children to take part in the activities of adult life. Any scientific study of a school system, therefore, must be based upon an analysis of the social conditions into which the student is likely to be graduated. Before making a detailed study of the Leavenworth schools, then, a general view of the community is important.

Leavenworth, Kansas, is now a city of about twenty thousand population. It is picturesquely located on bluffs overlooking the Missouri river, twenty-eight miles above Kansas City. Its topography, consisting of rolling hills extending back from the river, is unusually favorable for the development of beautiful home sites and lends itself readily to landscape gardening. These features, as in most western towns, however, have not been fully utilized.

Its population and industries are varied. A number of American elements have united with a variety of foreign immigrants to make a composite population unusual in a mid-western city. Manufacturing, mining, agriculture, and railroad and mercantile interests all contribute to a complex economic and industrial life. In addition, large national and state institutions are located on its borders and greatly influence its life. Altogether, it is an interesting city for observation and study along economic, social and institutional lines. It not only presents the ordinary phases of life in a small city, but furnishes many unique features; and its complex nature creates larger social and educational problems than are found in most cities of its size.

The first house was erected on the site of Leavenworth in 1854. The earliest village organization took place one year later. Its growth into a city was very rapid up to 1870, but since then its population has remained comparatively stationary. The following table shows the population at different dates:

1860	7,429
1870	17,873
1880	16,546
1890	19,768
1900	20,735
1910	19,363

ECONOMIC FOUNDATIONS.

Three things led to this early growth: First, it was a river town, and access to the eastern world was by boat. This made the obtaining of supplies easier than for most neighboring towns and favored more rapid growth. Second, in 1832 a government post was established on its

borders, and later it became a point of departure for many of the wagon trains headed for the Far West. This made it an outfitting post, calling for stores and other commercial enterprises. An evidence of this demand may be seen in the Planter's Hotel, now a large apartment hotel, which in its day was the most palatial on the river above St. Louis. Third, it was located in a rich agricultural region, which formed a substantial basis for permanent growth.

Two of these three features remain to the present. The paralleling of the river with railroads undermined the river traffic just after the Civil War, but the development of agriculture counterbalanced this loss. Moreover, the federal government not only retained the Leavenworth military post but added a federal prison, a military prison, a training school in military tactics, and a soldiers' home for aged and disabled soldiers. The state also established at Lansing, just south of the city limits, its State Penitentiary.

But the above-mentioned features have not been the only, or even the chief, economic features of the Leavenworth of later years. Manufacturing has long been and remains her largest source of wealth. Factories were established at an early date, and flourished. For several years it seemed Leavenworth was to be the leading city of the region, but several conditions led to the supremacy of Kansas City. A number of Kansas City enterprises were started in Leavenworth, but later business advantages led to their removal to the more rapidly growing railroad center.

UNIQUE FEATURES.

The most unique feature of Leavenworth is her state and national institutions. These institutions have influenced the city in many ways. In the first place, they have been an unfailing source of wealth, providing a demand for a variety of agricultural, manufactured and mercantile products.

In the second place, they have been a legally demoralizing force. This is inevitable where large bodies of men congregate and live under a divided governmental authority. The soldier element, whether from the army post or from the soldiers' home, look primarily to the federal government for control and have a tendency to disregard local government. They form an unruly civic element, and in Leavenworth, as in most places, they have succeeded in getting large immunity from local officials. Such a large number of idle or partly idle men with a little ready cash to spend are certain to be riotous at times, and create a demand for amusements of the lower sort. Pension day for three thousand old soldiers is apt to be a jubilation. The writer was informed that, as was to be expected, the old soldiers were "seldom arrested for offenses that would land the ordinary citizen in the lockup." The same was true of the younger soldiers to a lesser degree.

The fact that such a large number of persons are partly exempt from the law has a reactionary effect upon others. Unenforced law undermines respect for law, and discrimination in favor of the soldier element doubtless has some effect upon other citizens.

The third effect of these state and national institutions is to weaken, to a degree, local civic responsibility. Inquiry as to the reason for a lack of city parks brought forth the invariable reply that the government reservation to the north and the soldiers' home to the south were beautiful parks. Show places for visitors were not needed. Concerts at both the above-mentioned places were numerous and free. They were easily accessible. So the only reason for city parks was for playgrounds for the children. .It was freely admitted that so many things had been provided by the state and national government that one of the chief virtues asked of a legislator or congressman was the ability to secure these favors. Such an attitude is in line with universal human nature and makes local civic virtue a plant of slow growth, requiring much laborious nurture and scientific cultivation. Thus, there is found a difficult political, educational and religious situation.

There is some evidence, also, that the commercial value of these institutions affects the spirit of business enterprise. The writer was told that the ordinary demands of these institutions are so large that the usual reaching out for new business, advertising, and the hustling spirit are not so necessary as in other places. The same amount of business can be done with less energy than elsewhere, and consequently competition is less keen and inspiring to ambitious effort.

INDUSTRIES OF LEAVENWORTH.

Another general factor in Leavenworth calls for analysis. As before stated, it is a manufacturing town. Three large furniture factories, a stove factory, a saddlery and harness factory, agricultural machinery factories, amusement machinery factory, box factories, a packing house, several large flour mills, bridge and structural iron works, many smaller factories and numerous jobbing houses exist. Altogether there are seventy-nine manufacturing plants, employing over 1600 workmen, with a capital stock of $3,111,000 and producing an annual output of nearly $5,000,000. They have large pay rolls of both skilled and unskilled men and women. There are likewise coal mines. Formerly three large ones were operated (two at present), besides the one at the Kansas State Penitentiary. They vary greatly in the amount of work offered at different times and seasons. Their pay rolls are large but uncertain, and they assemble many people who naturally create hard school problems. Members of the Survey Staff saw several boys, who ought to continue in school, sometimes accompanied by their parents, asking for age permits that they might drop out of school and go to work.

These two industries, mining and manufacturing, necessarily lead to the importation and development of a large day-laboring class. Extreme economic planes are inevitable. The employing class and the working class in these occupations are far apart in standards of living. They clash in many of their ideals. Where these elements form as large a portion of the population as they do in Leavenworth, mixed civic aims, varied political motives, and uncertain institutional conditions exist. Social, political and cultural organization is difficult. And where organization for these purposes is difficult, there are likely to be found a social

aristocracy, the political boss, and a certain amount of cultural cant. Evidence of the existence of some of these things may be found in many of her institutions. The officers at the fort, the old families, and ambitious wealth have formed an exclusive social atmosphere. Many of the negroes, some of the laboring elements, and party fealty have made control by bosses easy. Cultural agencies have been largely for the few. During the whole generation from 1870 to 1904 the public High School charged all students a tuition fee.

RACIAL COMPLEXITY.

As the previous analysis of the industries of Leavenworth would indicate, the population is varied. The early settlers were of the usual eastern Kansas type. Many crossed over the border from Missouri. The regular stream of westward migration from the Northeast, East, South, and Middle West left its due portion. It is not a New England settlement, nor is it southern, nor foreign. No one element of the population dominates. Agriculture, mercantile business and the usual city industries are mainly controlled by the American and the better foreign stock. Moreover, the city is now getting old enough to be strongly moved by the "native son" element.

Above this native substratum is a great variety of foreigners and their descendants. Large German, English, Jewish and Polish elements are present. Many Italians and eastern Europeans also are found. It is to be noted, however, that Leavenworth was very fortunate in getting a high class of immigrants. The negro population is large for a Kansas town, comprising 12.79 per cent of the total. This large element has led to the segregation of the negroes into separate schools until the High School is reached. The last census report gives the following figures for the distribution of the population according to race:

Native white, native parentage	8,973
Native white, foreign or mixed parentage	5,444
Foreign-born white	2,464
Negro	2,477
Indian, Chinese and Japanese	5

FOREIGN-BORN WHITE OF LEADING NATIONS.

Austria	154
Canada	74
England	174
Germany	1,221
Ireland	342
Russia	165

While this diversity of race stock does not create the serious problems found in the foreign districts of our large cities, it does create problems not generally found in neighboring cities. The foreign immigration was mainly of an earlier day and of a superior class, so that practically all the children now speak English. But divergent ideals and different standards of education complicate the educational situation and explain the rather large percentage of illiteracy. The percentage for the whole state of Kansas in 1910 was 2.2, and for the urban population it was 2.4.

Over against this is Leavenworth's 3.3 per cent. The illiterate males of voting age comprise 2 per cent of the total for the state, while in Leavenworth they comprise 3 per cent of the total.

SOCIAL ORGANIZATIONS.

Institutionally Leavenworth shows the effect of the complexity of her problems and the influence creating them. Social organization is difficult. Twenty churches serve the twenty thousand people, except for half a dozen or more negro churches. There are four Catholic churches—German, Irish, Polish and negro—two Jewish, two Methodist, and one each of the following denominations: Presbyterian, Congregational, Christian, Episcopal, United Brethren, Lutheran, Evangelical, Baptist, Independent, and Christian Science.

In addition to the churches, there is a strong Y. M. C. A. It has an adequate building of its own, with a secretary, a physical director, and an annual budget of $6000. Its active membership is 310, and its work varied. Within the last year a Y. W. C. A. has been organized. The promise is large, since it has enrolled 650 members, has just employed a full-time secretary, has started various enterprises, and is planning a well-equipped building for the near future.

The public library is elegantly housed in a Carnegie building and well cared for. It has an annual budget of about $6000, a collection of 21,658 books, and an annual circulation of over 66,000. It is doing a variety of community service and working well with other institutions. Special collections of books are lent to the elementary schools and issued from the school buildings. Some of the churches have libraries, and likewise the separate schools.

The fraternal organizations of the city are of the usual type. The Elks have an elegant club house, and there is a well-equipped Turnverein. The labor organizations are also strong. But there is in general an apparent lack of recreation facilities of an organized type. Theaters exist, and "movies" galore, but they have been without adequate supervision. Plans to improve the supervision are started and coöperation with the schools is being fostered. Sociability is mainly along class lines. This lack of organized amusements only lends strength to the unorganized and illegitimate type, and makes law enforcement more difficult. Two small supervised playgrounds exist. They are treated as matters of charity, with but small interest or attendance. In the heart of Leavenworth is a population of 10,000 people with not a single play space larger than a town lot. Social, cultural and civic clubs exist, but not in profusion. Two women's clubs are affiliated with the Federation of Women's Clubs, and a Woman's Civic League is just awakening to its larger possibilities. Commercial and business clubs also exist. But the varied interests, ideals and occupations of the people have prevented elaborate social and philanthropic organization and rendered ineffective many of the existing efforts at coöperation in social and civic affairs.

SCHOOLS.

The school interests and facilities are varied. The school census of 1913 indicates an eligible school population of 6649. This has remained practically stationary for a quarter of a century. A mixed population

and native conservatism have led to a large demand for private and parochial schools. Consequently the public schools are not so large as the size of the city would lead one to expect. For several years the average attendance at the parochial schools has been above one thousand and that at the public schools three thousand.

Leavenworth has not been as liberal in supporting her public schools as the other Kansas cities of the first class. For years the tax levy for the support of schools has been beneath that of her sister cities. The school levy for cities of the first class for a period of ten years has been studied, and while not all of the information is obtainable, enough is at hand to show that Leavenworth ranked lowest until the last two years, and is still below the average. A table showing comparative tax levies may be found on page 48.

Not only has Leavenworth failed to tax herself liberally for the maintenance of her schools, but half a dozen years ago she voted down a bond levy for needed additions to the high school building. Later the school board raised the taxes and built the additions, but with many forebodings, and the present very moderate levy causes much public dissatisfaction.

A less tangible proof of a lack of active interest on the part of citizens of Leavenworth in her public schools appears in the small number of visits to the schools by the public and a lack of support for school enterprises. This was repeatedly brought out in conversations with the public, with the teachers, with high-school students, and was reflected in the recently organized parent-teacher associations. Personal politics in the shape of a quarrel between a former superintendent and a high-school principal had been allowed to divide the city into factions. For years party politics were allowed to enter into the election of the school board by automatically dividing the members to be chosen between the dominant parties. The provincial and in-breeding spirit has allowed unnecessary preference to local applicants for teaching positions, and favoritism instead of merit has had too much influence in the selection of teachers until very recently.

Happily, most of these evils are eliminated or are in the process of elimination. Leavenworth is becoming willing to pay for good schools by liberal taxation. School interest and parent-teacher coöperation are being fostered. Personal and party politics have largely disappeared in school matters. Teachers are being selected on their merits, paid a fair salary, and are being given friendly social recognition. If Leavenworth schools are going to improve—and every single chapter of this report will indicate that they are improving—public interest, public support and public coöperation are necessary; and these agencies must be held as responsible for that improvement as the school authorities themselves.

COMMUNITY SPIRIT.

One other phase of the city needs to be analyzed, and that is its general community spirit. That it is a cosmopolitan community follows from its varied industries and heterogeneous population. But this cosmopolitanism is of a mixed type. Class lines are evident in Leavenworth.

This social stratification makes church work, clean government, commercial coöperation and school democracy more difficult than in a more homogeneous community. Some radical elements and some progressive elements are found; but in the main, conservatism dominates. It is quite un-Kansan in this particular. New movements, new parties, new ideals and all sorts of fads make headway slowly. Ritualism in religion, formalism in education, party regularity in politics, negativism in amusements and respectability in society are necessarily in danger of overemphasis. There is evidence that in the past they have been too influential; but along each of these lines improvements may be noted.

As previously pointed out, a high standard of civic virtue is not to be easily obtained in such a mixed and uncertain environment. The number of temporary and irresponsible residents is so large that the ordinary amount of civic conscience in the responsible native elements can scarcely be expected to secure adequate sanitation and cleanliness in many quarters of the city. The spring clean-up day is needed oftener.

Leavenworth is well paved and the streets seem to be well cared for; but in the outlying districts and the draws and the unused lots neglect is apparent. The river bluffs are picturesque and might well be utilized for parks and playgrounds, to the benefit of large numbers of people. A general campaign on the part of her newspapers and organized clubs to develop a spirit of coöperation and local pride based upon real accomplishments would aid much in the civic reawakening which is at present visible in many parts of the city's life.

OCCUPATIONAL ANALYSIS.

A very excellent occupational analysis of Leavenworth has been made by Superintendent M. E. Moore of the Leavenworth Public Schools. It is a type of work that ought to be done in many cities. It, together with a study of the causes of elimination in all grades, should form the basis for a reëxamination of the curriculum and its administration in both the elementary and high schools. This should be done with the idea of better adapting them to the pupils while in school and better fitting these pupils to take an effective part in the industrial and social life of Leavenworth or some similar community after leaving school.

It is here appended, not only for its value in Leavenworth, but as a worthy bit of community study that might be valuable elsewhere in the educational field.

TABLE I.

Occupations Taken from the Directory of 1912.

Occupation.	*Number of whites.*	*Colored.*	*Total.*
Chauffeurs	9	....	9
Undertakers	10	1	11
Reporters	11	....	11
Accountants	252	2	254
Pharmacists	14	1	15
Civil engineers	3	....	3
Agents and salesmen	174	1	175
Apprentices	44	....	44
Bookbinders	6	....	6

Occupation.	*Number of whites.*	*Colored.*	*Total.*
Contractors (*a*)	5	....	5
Contractors (*b*)	54	....	54
Doctors, lawyers, dentists	79	4	83
Managers (*a*)	247	2	249
Managers (*b*)	28	....	28
Managers (*c*)	20	....	20
Machine operators (*a*)	100	3	103
Machine operators (*b*)	182	2	184
Painters, decorators	117	3	120
Telephone and telegraph operators	91	....	91
Photographers	12	....	12
Iron workers	125	....	125
Silver and gold workers	10	....	10
Railroad employees (*a*)	41	....	41
Railroad employees (*b*)	159	5	184
Woodworkers	450	25	475
Cement workers	98	....	98
Stone workers	10	....	10
Plasterers	90	2	92
Soldiers	106	29	135
Clerks (*a*)	40	4	44
Clerks (*b*)	619	1	620
Laundresses	33	55	88
Teachers	125	13	138
Publishers	15	....	15
Widows	767	178	945
Dealers (*a*)	17	....	17
Dealers (*b*)	320	8	328
Confectioners, hucksters	31	3	34
Bakers (not proprietors)	12	....	12
Domestics	82	80	162
Electricians	27	....	27
Engineers, firemen	131	3	134
Messengers	20	2	22
Shoemakers	29	2	31
Stenographers	80	2	82
Draftsmen, architects'	....	....	3
Milliners (*a*)	15	....	15
Seamstresses	184	1	185
Liverymen (*a*)	8	....	8
Liverymen (*b*)	92	2	94
Plumbers, fitters	52	....	52
Housekeepers (*a*) hotel	5	2	7
Housekeepers (*b*) restaurant	15	3	18
Housekeepers (*c*) rooms	44	2	46
Housekeepers (hired)	10	....	10
Nurses	41	3	44
Barbers	65	11	76
Mail carriers	25	1	26
Real estate, insurance, etc.	57	....	57
Laborers without mention of steady employment	568	209	777
Laborers holding steady jobs, given in directory	861	195	1,056
Unclassified	764	89	853
Federal employees (mostly guards)	91	2	93
Miners	520	103	623
Farmers, gardeners, florists, etc.	135	4	139
Cooks (*a*)	8	12	20
Cooks (*b*)	24	23	47
Tailors	52	1	53

Occupation.	*Number of whites.*	*Colored.*	*Total*
Butchers, meat cutters	34	....	34
Printers	44	....	44
Manufacturers	45	....	45
Ministers	29	4	33
Students	23	1	24
Musicians	19	3	22
Totals	8,721	1,102	9,823

An analysis of this table shows that 286, or 2.9 per cent of the total number, may be classified as professional workers requiring elaborate educational preparation; 87, or .9 per cent, are business managers needing a thorough commercial education; 1963, or 20 per cent, are commercial workers who need practical commercial training; 2204, or 22.4 per cent, are skilled industrial workers who need first-class industrial training; 3419, or 35 per cent, are unskilled workmen who need at least a practical elementary education; and 1866, or 19 per cent, miscellaneous.

CHAPTER II.

GENERAL FEATURES OF THE LEAVENWORTH PUBLIC SCHOOLS.

Walter S. Monroe.

THE LOCATION OF THE SCHOOLS.

THE Morris, Oak Street, and Third Avenue schools are to-day the large elementary schools of the city. In addition to these, which are for white children only, there are two schools for colored children, the Sumner School in South Leavenworth and the Lincoln School in North Leavenworth.

The Morris School is located in a thickly settled district in North Leavenworth. There is a large foreign element; Poles, Germans, and Italians being most numerous. The United States reservation, containing Fort Leavenworth, borders the city on the north. The army has some influence upon the school. A considerable element (45 per cent) of the people are well-to-do; a few are wealthy and a number are poor. This is an old section of the city, and the population is now drifting slowly to the southwest portion. Mining is the most prominent industry.

The Oak Street School is centrally located, near the business section of the city. The people are well-to-do, mostly merchants, with a few bankers. A few children (30 to 40) come to this school from the western part of the city, where truck gardening is the chief occupation.

The Third Avenue School is in South Leavenworth in the wealthiest section of the city. The district is thickly settled and the school is the largest elementary school in the city. In this school a number of children come to the seventh and eighth grades who live in outlying sections of the city.

The population of Leavenworth, while not growing in numbers in recent years, has been spreading out. This has made necessary buildings to accommodate at least the younger pupils in the outlying districts.

The Franklin School, built in 1903, is a four-room brick building in the southwestern part of the city. The first six grades are taught in this building, and from here the pupils enter the seventh grade in the Third Avenue School. The patrons of the Franklin School are a very industrious laboring class of people. Most of them own their own homes and have sufficient space for gardening.

The Jefferson School, a two-story brick building, was constructed in 1903. Employees at the federal prison, built several years prior to the erection of the Jefferson School, necessarily lived near their place of employment, and this fact led to a demand for a school in this neighborhood. In addition there is an element of prosperous truck gardeners.

The Maplewood School building, originally a seminary for girls, was purchased by the Board of Education in 1890 and rebuilt in 1903. The building has a splendid location in the western part of the city. The first six grades are taught here and the pupils enter the seventh grade at

the Oak Street School. The patrons of the school are mostly laborers, such as machanics, gardeners, bricklayers, stonemasons, and molders.

The Wilson School, a two-room building, was built in 1903 to accommodate a settlement of miners around the Riverside coal mine. Nearly all the miners are foreigners. Some of the patrons work in Helmer's furniture factory.

The Cleveland Park School was organized in 1911 to meet the demands of a population drifting into the southwest portion of the city. The building used for the school is a remodeled dwelling house. The school is located in a community of truck farmers and the employees of two large greenhouses.

TABLE II.

The Leavenworth Public Schools.

	Enrollment January 28, 1914.	Number of teachers, including principals.
High School	420	20
Third Avenue	446	11
Oak Street	376	13
Morris	380	12
Sumner	185	6
Lincoln	127	5
Franklin	124	4
Maplewood	262	6
Jefferson	143	4
Wilson	39	2
Cleveland	28	1
Total	2,530	84

THE ORGANIZATION OF THE SCHOOL SYSTEM.

A superintendent is at the head of the system. For the elementary schools there are a supervisor of arts and crafts, a supervisor of music, a supervisor of physical training, and two special teachers of domestic science and art. At the Third Avenue, Oak Street and Morris schools the principals do only a limited amount of teaching, and the principal of the High School devotes all of his time to supervision and administration. At the other buildings, except Wilson and Cleveland, substitutes relieve the principal at regular intervals.

THE SUPERVISION OF INSTRUCTION.

The principals are experienced and capable teachers who have been selected for their present positions with considerable discrimination. They are enthusiastic and vigilant in their work. Furthermore, they have the coöperation of their teachers. The teaching staffs of the several schools are well organized, and even details are not neglected. The effectiveness of the class-room supervision is evident in the work of the teachers and in the deportment of the school as a whole. In the matters of routine the supervision has been very effective.

The supervision in Leavenworth is of the type which is to be found in most schools. Several principals mentioned testing the work of a teacher. These tests were oral and the estimate made of the ability of the class necessarily was a matter of opinion on the part of the principal.

We are just beginning to develop a new type of supervision in which scientific methods of procedure will take the place of personal opinion or prejudice in the valuation of methods and results. This type of supervision, because of its newness, we could hardly hope to find in Leavenworth.

The Courtis Standard Tests in arithmetic have been standardized and are very convenient to use. We have two scales of handwriting which may be used with profit. Other tests and scales are in course of preparation. Within a few years supervisors will have at their command tests and scales which will make possible an entirely different type of supervision, in which facts will take the place of opinion. In Leavenworth the application of measurement to the work of the schools should be under the direction of the superintendent, but he can not take the time necessary for the actual work without seriously impairing his usefulness to the community. Besides, it is more properly the type of work which should be done by the building principals as a part of their work of supervision. In the case of the Third Avenue, Oak Street and Morris schools, the building principals can do much in this way to increase their service to their respective schools and the community.

THE SUPERINTENDENT SHOULD HAVE A SECRETARY.

Perhaps the most effective work of the present superintendent has been in creating a stronger community interest in the public schools. The most tangible results of his labors in this direction are the parent-teacher associations which have been formed within the present year. By temperament he is peculiarly suited to render this type of service, and he would be able to serve the community better if he were provided with a secretary, who could attend to many petty details which he is now compelled to take time for.

At present the superintendent must type all his letters, answer all telephone calls except such as the clerk of the board answers, notify teachers of all meetings, file transfer cards, etc. Quarterly reports have been issued this year in mimeographed form. These are valuable, and the practice should be continued with a more complete report at the end of the year. Under the present arrangement the superintendent must do all the work of preparing these reports, even the mimeographing.

This practice is expensive. It makes the highest-salaried man in the whole school system spend a large amount of his time doing what a $50 to $75 secretary could do just as efficiently, perhaps more so, since she would be trained for the work and would not have to do it piecemeal. The high-school principal, who does no teaching, is provided with a secretary, and most of the other principals receive clerical assistance from the substitute teachers.

A secretary to the superintendent should be a person who has had sufficient experience as a teacher to understand the work of a school system and who has had office training besides. With a secretary of this type, the work which the superintendent is now doing would be more efficient and the scope of his services could be enlarged.

ASSISTANT SUPERINTENDENT RECOMMENDED.

The Survey Staff believes the school system would be much strengthened by the addition of an assistant superintendent or educational expert who would rank between the superintendent and the high-school principal. This man should be vitally interested in public-school work, particularly the work of the elementary school, should have had experience as a city superintendent and as a teacher in the elementary school, and must have had recent training in the field of education, especially in school administration of the scientific type.

He should be placed in charge of the normal-training work, but should not devote all of his time to teaching. Under the direction of the superintendent, he should guide the teachers in doing constructive work in the direction of reorganizing the subject matter of the program of studies and in the testing of results. He should take the lead in placing the teaching and supervision in Leavenworth on a scientific basis; that is, upon a basis of facts and not opinions. As we point out in another place, the principals should be in immediate charge of this work, but to make such work most valuable to the community there must be a source of expert advice and a clearing-house for the facts gathered. Data which are collected by means of tests have only small value until they are compared with other data which have been collected in the same way. Such a man as we recommend would be very valuable in comparing and interpreting the data collected; and in order that there may be uniformity it should be collected under his supervision.

To those who may claim that this is just what the superintendent is for, it should be pointed out that the superintendent's office has two functions which are quite distinct. The one is primarily administrative, the second supervisory. In a community the size of Leavenworth, with a teaching staff of nearly 100 teachers and an annual pay roll of over $65,000, the total work to be done is too much for one man if a high degree of efficiency is attained. The Survey Staff believes that the superintendent can be most valuable to the community by continuing the things which he is now doing, *i. e.*, maintaining a general supervision over the system, interesting the community in the schools, furnishing inspiration for the teachers, and performing the other similar duties of his office. This is enough for one man to do well, and doing the type of detailed work such as we have recommended tends to incapaciate a man for the other duties. By adopting this recommendation Leavenworth will align her school system with the most progressive in the country.

CHAPTER III.

THE SCHOOL BOARD.

Walter B. Smith.

THE Boards of Education in first- and second-class cities in Kansas are organized under a general statute of the legislature of 1911. They consist of six members elected for a term of four years each, three being elected every two years. Before the enactment of this law the Board of Education of Leavenworth had consisted of twelve members elected for a two-year term.

The board is organized with a president, vice-president, clerk, and treasurer. The president exercises the functions usually devolving upon that officer, and the city treasurer serves *ex officio* as treasurer for the board, receiving $50 a year therefor. Since the money is banked by sealed bids there are no perquisites. The clerk is chosen by the board and is required to furnish bond for $1000. This clerk keeps a journal of the proceedings of board meetings, looks after the records, books and documents of the board, countersigns all warrants upon the treasurer, and must publish an annual report giving details of the board's fiscal operations, and perform such other duties as the board may require. This office has long been an important one in Leavenworth. It pays a salary of $1200 per year, and for the last ten years has been filled by the present incumbent.

The result of a good salary and the continuous service of the clerk are well demonstrated in Leavenworth. An excellent system of records is kept. The minutiæ of administration of such an office call for cumulative knowledge, and only long service can meet the incessant demands for petty detailed services. Supplies for a large school system are multifarious and multitudinous. Specifications for contracts and bids for supplies, blank forms for records, and requisitions, orderly methods of filing information, records and plans, and stowing away materials, call for not only a special type of mind, but can be more effectively done with long practice and continuous experience. The board is to be commended for this general policy, and the completeness of the records and business formulæ would indicate that their choice of a clerk is also worthy.

POWERS OF THE BOARD.

The powers of the Board of Education are full and complete and their duties are numerous. They are to "make all necessary rules for the government of the schools" and "to exercise the sole control over the public schools and school property of such city." They are to elect a superintendent, teachers, janitors, a truant officer, clerk, etc. All fiscal operations must be under their control. The compulsory-education law must be enforced, and definite provisions for safety in case of fire must be made.

From a comparative standpoint, the most important power lodged with the board, however, is the levy of taxes. It has full control of the

levy for school purposes. The rate may be made whatever it pleases up to six mills on the dollar for running expenses, and above that the board may levy enough to carry the bonded debt of the school district. With these powers, several of the boards in both first- and second-class cities of Kansas have levied seven mills on the dollar and above.

COMPOSITION OF THE BOARD.

An analysis of the various boards of education since 1894 indicates an average term of service of about four and three-fourths years. The average length of service of the present board is four years. Frequent elections under the old system led to many short terms, and consequently to a lack of the necessary continuity of service to produce high efficiency. The new method of election for four years is sure to work a helpful reform along this line.

There are two weaknesses inseparable from short terms in public-service corporations. One is that the duties required are so complex that the novice may assume little responsibility and become a figurehead. The other is a far more serious danger. It is generally recognized that in a democracy like ours the most dangerous man, whether in politics, religion, business or the schools, is a man with convictions and no knowledge. All of us are prone to act most impulsively and precipitately in the fields where we are least informed. It is a matter of general observation and comment that the new man on a public-service board is likely to be willing to act first and think afterwards. This applies especially in reform movements, churches and schools, where every one has pretty clearly defined feelings and convictions.

It is greatly to be desired in school boards that thoughtful men should be chosen and continuity of service be maintained where possible. The Survey Staff is consequently ready to urge upon the Leavenworth public the desirability of reëlecting good men, and upon members of the school board the responsibility of serving long enough terms to enable them to become fully conversant with the school system and school needs. This will guard against hasty action and enable boards to work out constructive plans far enough in advance to insure efficiency and economy in any progressive measures.

A school board, to be well balanced, should represent various interests, and big enough men should be elected to consider the needs of various parts of the city. Undue attention to geographical locality, however, is pernicious and should be avoided. The caliber of men elected is much more important than the place of residence of the board member. Under the old system of ward election this dependence upon geographical location was necessary, but under the new system its evils may easily be avoided. Any citizen with a sufficient sense of civic and school responsibility would represent the whole city, not merely the wants of a particular locality.

A history of the Leavenworth board indicates that a representative body of citizens have filled those offices. In the last twenty years, seventeen merchants, nine professional men, seven manufacturers, four contractors, three bankers and thirteen other representative business men

have served the community as members of the school board. Of the present board two are professional men, two are merchants, one is an editor, and one is a railroad man. Two were born and educated abroad, one in New York, and the other three are natives of Leavenworth. All are actively interested in the Leavenworth schools; two have served eight years, two three years, and two are new members the present year. No one was found to question the public spirit or unselfish zeal of a single member.

WORK OF THE BOARD.

They are required by law to meet the first Monday in each month and at call. The minutes for the present school year were read by the writer, and interviews were held with each member (except one, who was in Europe). All regular meetings have been held, and one called meeting. These meetings have been from less than one hour to more than two hours in length.

The board is divided by the president into five committees, each member, aside from the president, being chairman of a committee. These committees are as follows:

1. Ways and Means and Supplies.
2. High School, School Laws and Regulations, and Libraries.
3. Teachers and Salaries, Textbooks and Course of Studies.
4. Buildings and Grounds and Janitors.
5. Furniture, Apparatus, Printing and Auditing.

These committees are the real working features of the board, as indicated both by conference and by the length of time spent in general meetings. In fact, it may well be questioned if sufficient time is spent by the board as a body in session to develop a full spirit of coöperation or a large enough body of information about the school system as a whole. Conferences with the board indicated a general rather than a specific knowledge of the conditions and needs of the schools. Inquiries failed to elicit information that any member had done much school visitation or thought over the situation enough to have any constructive plan for the betterment of the schools. While all were open to conviction and ready to accept suggestions for improvement, the attitude was a passive rather than an active one.

Since the members of the board are not technical experts, this attitude is immensely to be preferred to such meddling interference with purely educational affairs as is often found in boards of education, notably in the Portland system, as shown by the recently published survey of the Portland schools. But a little more of a forward look, a little more contact with actual schoolroom work, a little more knowledge of what is being done, a little more conference with teachers and principals, and a little more of specific planning for the ever-enlarging demands of education in the matter of equipment, will yield a rich harvest in putting the Leavenworth Public Schools to the front.

An illustration of the need of advance planning came out in conferences with several different members of the board. They are unanimous in feeling that the greatest need of the schools at present is more room about the buildings for playground purposes. In discussing costs

of adjacent property it was agreed that any knowledge of plans for the purchase of property would lead, in the usual patriotic American way, to an increase of the cost of such property. Yet no plans were being made until the money for such purchases was at hand, although a knowledge of the presence of such plans would guarantee that this additional price would be demanded. Some of the members were unaware that needed property could be acquired under the right of eminent domain. Since the board are agreed, it seems that the wisest and by far the most economical scheme would be to set aside a certain minimum amount of money each year to be used in this expansion.

THE RELATIONS OF THE BOARD TO THE SUPERINTENDENT.

The board is to be highly commended for its policy in leaving purely educational problems to the authorities selected for that purpose. The law gives practically complete powers to the board, and many boards are unwise enough not to delegate that authority to experts. Many elect a high-priced superintendent, who ought to know his business, and then proceed to tie his hands with rules and regulations so that his work is crippled. Education is a progressive business, and only a progressive superintendent can keep up with it; and he can not do it if interfered with and hampered by a politically chosen or unprogressive board.

The proper lines of demarcation between the functions of a school board and a superintendent are perfectly clear. The relations should be exactly similar to those between the board of directors of a railway or manufacturing or banking corporation and the active managers of those concerns. The directors advise and recommend, and, if need be, check the president in too rapid expansion of the business or in a manifestly unwise policy. But the successful corporation is managed by a generally unhampered and well-supported president whose reputation is at stake and whose interests are bound up with those of the stockholders. The same must be true of a school system. The superintendent should be very carefully and wisely chosen, and then held fully responsible for the success of the schools. Just as the president of a railroad must be free to select his expert assistants, so must the superintendent be free to select his teachers, even his janitors. When he proves unable to do this wisely he has proved his unfitness for his position.

The Staff is glad to be able to say that this higher policy is followed by the Leavenworth board. They are to be commended for electing their superintendent for two years—as long a term as the Kansas law allows. And they stand back of him in his policies. So far as could be determined, he is allowed full power in the selection of his expert assistants. Teaching efficiency depends largely upon a settled feeling—an identification of the teacher with the whole responsible life of the community. The teacher must feel that his position is secure so long as efficient service is rendered, and only so long. We are glad to be able to say that the Leavenworth teachers feel much of the necessary security in their positions. It is unfortunate that teachers are employed, not as other people are, but to be automatically discharged at the close of a year; but that being the custom, the Leavenworth board do the next best thing by making employment fairly permanent.

THE PURCHASE OF SUPPLIES.

While this excellent business principle is followed with reference to the superintendent and the teachers, there is a strange lapse from business practice in the purchase of supplies. The factory, or street-railway system, or other large business that allowed a number of inexpert persons to purchase supplies would soon lose out in the competitive struggle. But that is exactly what is often allowed to happen in public business; and the Leavenworth school board has fallen into this antiquated practice. Buying supplies for as large and varied a business as the Leavenworth schools is business fit only for an expert fiscal agent. Most of these supplies are prepared by specializing firms and may be handled cheaply in large quantities. A good fiscal agent knows the firms making them and can buy directly. Such an expert is required to learn the quality and specifications of articles needed and to get unquestioned supplies without delay.

The present board have the confidence of Leavenworth. They are honest. But not a member would maintain that he is an expert buyer of school apparatus. Yet he attempts the role. A requisition for supplies is made out by the clerk; it is countersigned by the superintendent, and then sent to the appropriate committee. The chairman of that committee will then have to see his committee and make the purchase or submit it to the board. Even small and necessary supplies are thus delayed. And what member of the board feels that his judgment is good in regard to the particular sort of things usually needed about a school building?

An illustration was at hand during the Survey. A field meet was being planned by the director of physical training for the last of April. Supplies were asked for during the latter part of February. They were needed very soon. No one objected to their purchase. A requisition was made out and was accepted by the board at its meeting on March 2. The supplies will cost about fifty dollars. It is now the 18th of March, and bids are not called for until April 6. The supplies, therefore, can not be expected before the middle of April—six weeks to make a purchase no one objected to; and this by a board which the public expects to handle expeditiously the business end of public-school work.

There might be some excuse for this unbusinesslike and extravagant method of buying supplies if the means were not at hand for remedying it. But the proper organization already exists. A clerk is paid a good salary to look after details for the board. It is easy and natural for him to learn the specific needs of the schools. He knows what sort of brooms, dusters, crayon, paper, gymnasium apparatus, laboratory supplies, etc., are used, because he has to handle them from the storeroom. His whole time and interest are centered about his work; therefore he becomes the natural fiscal agent for the board. Such should be his chief work, and the Leavenworth board should return to its former practice in this matter, allowing the clerk to purchase the supplies under proper supervision, or else it should appoint some other expert fiscal agent.

Another evil is in the results upon the schools. Teachers ask for supplies, which are delayed so long that a large share of their value has

disappeared before they can be obtained. This happens a few times, and the teachers grow indifferent toward the use of up-to-date tools and illustrative materials. They either do without or through their own zeal go to the expense of buying them out of their own savings. Several of the Staff found teachers using expensively acquired private equipment rather than go through the elaborate process of red-tape required to get it through the board. This puts a tax upon the zealous and progressive teacher and discourages and disheartens the less efficient and less unselfish ones. The total result is that the net salary of the poor teacher is larger than that of her more progressive sister teacher.

On the whole it may be said that the present board is doing its allotted work effectively. It is honest, sticks to its proper function in general, shows courage in levying a fair rate of taxes at present in the face of a not too generous public feeling, and gives unselfishly of its time and energy to an unpaid public service. Any criticism of its work must be largely negative; that is, that it may sometimes lack foresight or depth of knowledge of school problems or enough intensive study of the actual needs of the school system to lay plans in advance for the constructive program much needed in the near future of Leavenworth.

RECOMMENDATIONS.

1. That the board be careful at all times to continue to stick to its own work—the business administration of the schools—interfering only when necessary with the educational administration.

2. That the former excellent practice of turning over the purchasing of supplies to the clerk of the board be returned to, or an expert fiscal agent be employed.

3. That a definite budgetary system be established, whereby all income shall be estimated at the beginning of the year and parceled out to meet the needs of the schools as they have been reported through principals and superintendent.

4. That the present moderate tax rate of six mills on the dollar be maintained for the running expenses of the schools, for the more liberal purchase of equipment, and for the necessary repairs and remodeling needed in some of the half-century-old buildings to adapt them more fully to up-to-date school work.

5. That an expert school architect be consulted for this remodeling and for future school expansions.

6. That a definite and comprehensive plan be carefully worked out for the purchase of additional land about some of the buildings, and a certain sum of money be set apart in each annual budget for this purpose.

7. That a similar definite plan be devised for some of the expansions which all recognize will be demanded in the near future, many of which are recommended in other parts of this report.

8. Finally, that through the press, the parent-teacher associations, and the various cultural and business organizations of the city, a campaign of publicity be inaugurated for the education of public sentiment regarding the needs of the schools and of the commercial and other values of meeting these needs in the building up of a greater Leavenworth.

CHAPTER IV.

ATTENDANCE, PROMOTION AND RECORDS.

Walter S. Monroe.

THE SCHOOL CENSUS.

IN A CITY the size of Leavenworth the first prerequisite for securing the enrollment of children in school is a reliable census of all the children of school age who are living within the school district. From this census list teachers or some other authorized person should check off those who enter school at the beginning of the school year. The names of those whose age falls within the period of compulsory attendance, and who have not enrolled in school, should be given to the truant officer for investigation. In this way all cases of nonattendance can be checked up, except for pupils who have moved into the district since the census was taken. For these cases the school has to depend upon the coöperative spirit of the community and the acquaintance of the teachers and the truant officer with the community.

In Leavenworth the school census is taken under the direction of the clerk of the Board of Education, who employs competent persons to make the necessary house-to-house canvass. The census is taken upon the blanks provided by the state superintendent for that purpose. The data collected are transferred to cards for the purpose of convenient filing, a card being made for each child. These cards are filed alphabetically, and are used by the truant officer and in making out age certificates. Each year a new census is taken and a new set of cards is made out. There are on file now the cards for the last six years. The only use which is made of the data of the previous year is when a parent or child questions the accuracy of the data for the current year.

The weakness of the system is in not providing an automatic check upon human fallibility. Errors may be made by parents in giving the age of a child. The enumerator may make an error in entering the data. There may be errors in transcribing the data upon the cards. And last, children may be missed even in a careful enumeration. To guard against these possible errors it is recommended that instead of there being a new set of cards each year, the data collected in the blank books be checked on the cards of the previous year. If a pupil had moved, the changed address could be added on the card or a new card made. New cards would be made for those who had moved into the district within the year and for those who had attained school age. The cards remaining from the previous year after this was done would include, first, those who had passed school age, and those who had either died or moved from the district within the year, and second, those who were overlooked in taking the census.

Such a plan would not call for more labor than is now required to make out a new set of cards each year. It would have the added advan-

tages just indicated, and would provide a permanent and continuous school census. During the school year cards should be added to this file for the children who move into the district.

THE FUNCTION OF THE SCHOOL CENSUS.

A school census should have functions in addition to giving a count of the children of school age living within the district. For instance, from a school census the number and age of children living in the district and not attending school could be easily determined. Such data, together with the grade attained by the child before leaving school, would portray some of the educational needs of the community. In a city the size of Leavenworth it doubtless would show several hundred boys and girls between the ages of fifteen and twenty-one who are not in school, and some of whom have not even finished the eighth grade. These young people represent an urgent educational need of the community, and if our schools were conducted as a private business, accurate data concerning them would be collected and used in the administration of the schools.

ATTENDANCE.

A comparison of the age distribution of the school census for 1913 with the age distribution of the enrollment for the year 1913-'14 shows that there are 826 more children between the ages of eight and fifteen years enumerated in the school census than are enrolled in the Leavenworth public schools. The enrollment in the parochial schools of the city for the year 1913-'14 was given as 1137. Since the work of the parochial schools does not extend beyond the eighth grade, except in one instance, these figures indicate roughly that the compulsory-attendance law is effectively administered in Leavenworth.

TABLE III.

Age Distribution of Children Enumerated in School Census, 1913.

Age.	Number of children.	Per cent of total.	Age.	Number of children.	Per cent of total.
5	382	5.8	13	351	5.4
6	406	6.2	14	388	5.9
7	345	5.3	15	361	5.5
8	370	5.6	16	457	6.8
9	323	5.0	17	493	7.5
10	326	5.0	18	560	8.5
11	332	5.0	19	529	8.0
12	322	5.0	20	572	8.7

At the end of the first month of school, each teacher is required by the rules of the Leavenworth Public Schools to file with the superintendent a list of the pupils enrolled under the teacher. Thus by October first the truant officer has the data necessary for checking up the school attendance. The truant officer has a regular schedule for visiting the several buildings. He also visits regularly the parochial schools. Whenever a transfer of a pupil is made, a card giving the facts is filed with the truant officer. It is his duty to check up the transfer. Thus if the transfer is simply an excuse for leaving school it is detected at once.

REPORTS OF TRUANT OFFICER.

A summary of the annual reports of the truant officer for the past four years is given in Table IV:

TABLE IV.

Summary of Reports of Truant Officers.

	1908-'09.	*1909-'10.*	*1910-'11.*	*1911-'12.*	*1912-'13.*
Number of cases investigated	0	468	303	312	317
Number of pupils placed in school	0	247	62	58	43
Juvenile court:					
Before court	0	5	13	4	4
Convictions	0	5	*13	4	4
Other courts:					
Before court	0	0	0	0	0
Convictions	0	0	0	0	0
Sent to industrial schools:					
Boys	0	2	3	4	4
Girls	0	0	1	0	0

* Nine boys paroled.

The drop from 247 pupils placed in school in 1909-'10 to 62 in 1910-'11 is significant. It shows the influence of a vigorous administration of the compulsory-attendance law. The fact that conviction was secured in every case which was brought before the court indicates that the court is used only as a last resort.

From conferences with the superintendent and the truant officer, it appeared that the law was well and intelligently administered so far as concerned the pupils who entered school in September. For those who do not voluntarily enter school, the system followed has a very evident loophole when applied to a community as large as Leavenworth. A month must elapse before the attendance can be checked up, and then the burden of checking is placed upon the truant officer, who has no clerical help. And the fact that the teacher's lists are on large sheets of paper makes the checking very tedious.

In order that there may be an earlier checking up, it is recommended that the teachers be required to report the pupils enrolled at the end of the first week of school, and to report these data on cards similar to those on which the census data are recorded. When the enrollment cards are alphabetized it will be comparatively easy to determine if all children are in school who should be.

Children who are between the ages of fourteen and sixteen must file with their employer age certificates. In Leavenworth age certificates are issued by the clerk of the Board of Education, who has access to the alphabetized census record. The form supplied by the commissioner of labor and state factory inspector is used. No record of age certificates issued is kept, except that the card is taken from the file and placed in a separate file after being marked. It would seem worth while to keep at least a record of the pupil's age, sex, grade attained in school, and reason for leaving.*

* Since this was written a form has been devised by the clerk of the board, on which this and other information is to be recorded in the future.

TABLE V.

Distribution of pupils according to number of days attending school, not including those who moved into the district or moved from the district during the year and who transferred to and from the parochial schools.

ELEMENTARY SCHOOL, 1912-'13.

Number days attended.	Number of pupils.	Per cent of total.	Number days attended.	Number of pupils.	Per cent of total.
180–176.....	815	45.89	95–91.....	3	.17
175–171.....	304	17.12	90–86.....	1	.06
170–166.....	175	9.85	85–81.....	3	.17
165–161.....	117	6.58	80–76.....	3	.17
160–156.....	81	4.56	75–71.....	2	.11
155–151.....	59	3.32	70–66.....	..	....
150–146.....	49	2.76	65–61.....	2	.11
145–141.....	42	2.36	60–56.....	..	....
140–136.....	36	2.03	55–51.....	1	.06
135–131.....	20	1.13	50–46.....	1	.06
130–126.....	13	.73	45–41.....	1	.06
125–121.....	12	.67	40–36.....	1	.06
120–116.....	15	.84	35–31.....	..	....
115–111.....	6	.34	30–26.....	1	.06
110–106.....	6	.34			
105–101.....	3	.17	Total	1,776	
100– 96.....	4	.22			

REPORTS OF ATTENDANCE.

In the quarterly reports of the superintendent for the present year the attendance is reported in terms of the number enrolled, number belonging, and the per cent of attendance. This method of reporting is quite usual, but very unsatisfactory, for it fails to reveal the facts which need to be known.

The total days absent for the 1776 pupils in Table V exceeds 20,000. The cost of the instruction which was provided and was not received by these pupils amounts to approximately $2500. This amount inadequately represents the cost of absences to the city of Leavenworth. This is no small item, and the parents may well bear this in mind when permitting unnecessary absences.

From this analysis of the table it should be clear that this is a more valuable form in which to report the attendance than the one now used. It is a form which is coming to be used, and the writer recommends it for future reports.

TABLE VI.

Age and Progress of the Pupils in the Leavenworth Public Schools, taken January 20, 1914.

	I	II	III	IV	V	VI	VII	VIII	F	S	J	Sr	P	Total.
5 yrs.	69	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69
6 yrs.	176	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	207
7 yrs.	104	127	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	254
8 yrs.	20	52	95	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	195
9 yrs.	5	26	80	120	18	3	.....	.....	.....	.....	.....	.....	.....	252
10 yrs.	4	18	32	68	70	21	3	.....	.....	.....	.....	.....	.....	216
11 yrs.	2	7	22	44	59	68	17	.....	.....	.....	.....	.....	.....	219
12 yrs.	1	6	12	27	45	63	58	13	4	.....	.....	.....	.....	229
13 yrs.	.....	.....	5	25	26	71	67	31	28	.....	.....	.....	.....	253
14 yrs.	.....	.....	1	2	11	21	42	55	70	17	2	1	.....	222
15 yrs.	.....	.....	.....	.....	3	4	20	33	24	49	19	.....	.....	152
16 yrs.	.....	.....	.....	.....	.....	1	10	8	15	24	39	15	.....	112
17 yrs.	.....	.....	.....	.....	.....	.....	2	6	2	14	27	25	4	80
18 yrs.	.....	.....	.....	.....	.....	.....	.....	1	2	4	11	15	3	36
19 yrs.	.....	.....	.....	.....	.....	.....	.....	.....	1	3	2	5	4	15
20 yrs.	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	0	1	4
Total..	381	267	270	314	232	252	219	147	146	112	102	61	12	.....
Below..	69	31	23	28	18	24	20	13	32	17	21	16	4	.....
Normal	280	179	175	188	129	131	125	86	94	73	66	40	7	.....
Above.	32	57	72	98	85	97	74	48	20	22	15	5	1	.....

THE PROGRESS OF PUPILS.

According to this plan (see Table VI) the "normal" ages for the first grade are 6 and 7, for the second grade 7 and 8, for the third 8 and 9, and so on. When a pupil's age is less than the "normal" age for his grade he is said to be "below normal," or under age. When his age is greater than the "normal" age for his grade he is said to be "above normal" age.

The table shows that some children in Leavenworth start to school when they are five, some when they are six, others when they are seven, and possibly a few when they are eight. Those who start to school at five are "below normal" age in the first grade. If they are promoted at the end of the year they will be "below normal" age in the second grade, and so on. If a child is six or older when he starts to school, it is possible for him to become "below normal" age only by sometime skipping a grade. On the other hand, a child who enters school before he is eight can become "above normal" age only by failing to be promoted.

This age and progress table for Leavenworth shows 69 pupils "below normal" age in the first grade, 31 in the second grade, 23 in the third

grade, 28 in the fourth grade, and so on. The table does not tell us positively, but it suggests that very few pupils are "below normal" age because of skipping a grade; that the pupils "below normal" age are so primarily because they started to school when five and not because they possess greater capacity for the work of the school than other pupils.

When we consider those "above normal" age, we find 32 in the first grade, 57 in the second, 72 in the third, 98 in the fourth, and the number remains relatively high until the eighth grade. These facts tell us quite conclusively that many of those who are "above normal" age have become so because in some grade they failed to be promoted, and that only a few are "above normal" age because they started to school after they had passed the age of seven. Not all of those who fail of promotion are included in the "above normal" age group. Considering those of "normal" age, we find the ratio of the two ages varies from 127 to 52 in the second grade to 31 to 55 in the eighth. These figures indicate that a number fail of promotion who are still included in the group of "normal age."

This condition is significant for two reasons: First, it is expensive. For the year 1912-'13 the expenses of the Leavenworth Public Schools totaled $88,918.20, or an average of $31.85 for each pupil enrolled. In the case of a pupil who failed to be promoted and must do the year's work over, this $31.85 was largely wasted. If 20 pupils fail of promotion the cost is $637, or the salary of a teacher paid $70 a month. And second, these figures indicate, and more careful studies have shown it to be true, that it is the child who is "above normal" age who is most likely to leave school and not take advantage of the educational facilities which the community has provided.

There will always be, or should be, some pupils who fail of promotion or are retarded, because all are not equally capable. But it will be most economical to adjust the work of the school so that the number failing will approximately equal the number who skip a grade. In this way the loss on the one pupil will be balanced by the gain on the other. Such a system would probably also decrease the number of pupils who leave school. The figures indicate that the Leavenworth Public Schools are so adjusted that a number of pupils are retarded and very few are accelerated. The system can be made more efficient by making these groups more nearly equal.

Such a table as the one above is valuable in exhibiting the age and progress of pupils, but it necessarily leaves one in doubt about many questions. For instance, take the pupils in the eighth grade. One does not know how many years the 24 who are 15 years of age have spent in school. In this table they are given as being "normal age," but it is probable that some of them have been retarded at some point of their course. For this reason it would be helpful to supplement this table by another showing the relation between the grade and the number of years spent in school. From such a table it will be possible to determine the amount of acceleration and retardation. Knowledge of these items is essential to efficient management of a school system.

ENROLLMENT IN THE HIGH SCHOOL.

TABLE VII.

Per cent of Distribution of High School Enrollment.

	First year.	Second year.	Third year.	Fourth year.
Leavenworth	34.68	26.60	24.23	14.49
Federal	41.73	27.08	18.21	12.98
Kansas	42.46	26.27	17.38	13.89

The figures in Table VII show that fewer pupils leave High School in Leavenworth before the senior year than in general in the state of Kansas or the United States. However, the drop from 34.68 per cent in the first year to 26.60 per cent in the second year shows that many who enter the High School do not enroll the second year. Also the drop between the third and fourth years is significant. It is quite evident from these figures that in Leavenworth the first and third years of the High School are the critical years.

RECORDS AND REPORTS.

The system of records and reports is moderately elaborate. Reports are made by teachers quarterly to their principal, and a summary of their reports is made by the principal to the superintendent. These reports include the usual items with reference to attendance, corporal punishment, suspensions, etc. In addition, there are a number of items such as the number of visits by the Board of Education, superintendent, principal, supervisor, and patrons, the work of the truant officer, etc. At the close of the year a complete report is made for the year.

In addition, in the elementary school the following blank forms are used:

1. Notice of supervision assignment. (For buildings and grounds supervision for the week. Made by the principal.)
2. Work needing attention of janitors.
3. Temperature record. (Hourly record from 8:30 to 4:30. The janitors register temperature and the card is filed with the principal at end of week.)
4. A warning notice to parents of children who are not doing satisfactory work.
5. A warning notice to parents of children who have been irregular in attendance. (The rules of the Board of Education provide that more than five half-days' absence in four consecutive weeks without satisfactory excuse will result in suspension.)
6. A suspension notice.
7. "The Teachers' Loose-leaf Plan Book." (Requiring a plan for each day's work.)
8. A blank form for recording the daily program.

By far the most valuable records are those kept of individual pupils. When a child enters school the following card is filled out by the parent:

LEAVENWORTH PUBLIC SCHOOLS.

ENTRANCE CARD.

.....School .....Grade .....Teacher.

1. Name of child.....
2. Date of birth, year.....month.....day.....
3. Place of birth..... Nationality, Father..... Mother.....
4. Name of parent or guardian..... Occupation.....
5. Residence (street and number).....
6. When vaccinated .....
7. By whom vaccinated.....
8. Defective sight, Yes..... No..... Throat, Yes..... No.....
9. Defective hearing, Yes..... No..... Teeth, Yes..... No.....

Parents receiving this card will please fill out the nine numbered blanks and return to teacher.

To be used in the primary grades in securing information from parent.

An attendance and scholarship record is kept for each pupil on a loose-leaf form, and in addition there is a progressive record card for each pupil which extends over twelve years. On one side of this card there is space for recording for each quarter of each year the date of entering the room and grade, the number of days he was a member of the room, number of days admitted, days absent, times tardy, days dropped, date of readmittance.

Individual and accumulative records of pupils are among the most important records which can be kept in a school system. As has been pointed out by the National Educational Association Committee on Uniform Records and Reports, the records made by teachers in the schoolroom are the foundation of all statistics concerning pupils; and without reliable statistics concerning pupils, no superintendent can administer a school system in a scientific manner.

The forms used in the Leavenworth Public School collect in a usable form the records made by the teacher in the schoolroom. However, the progressive record card would be more useful if the attendance record were given by years only and the space saved were used for a progressive scholarship record in each school subject.

TABULATIONS RECOMMENDED.

The purpose of collecting and recording data is the use which may be made of them. Only partial use is made of many of the data collected in the Leavenworth Public Schools. For instance, the following tabulations* are very valuable for the scientific management of a school system:

1. Distribution of withdrawals, by ages and causes.
2. Distribution of attendance according to number of days attended.
3. Graduates, by years in school.
4. Nonpromotions, by grades and causes.
5. Failures, by studies and grades.
6. Distribution of leavings and withdrawals, by ages and grades.

* See Report of the Committee on Uniform Records and Reports. Bull. 1912, No. 3, U. S. Bureau of Education.

In a school system the size of Leavenworth's the superintendent can not be expected to make these uses of the records unless he is provided with clerical assistance. In another section of this report it is recommended that the superintendent be provided with a secretary. The tabulation of data under the direction of the superintendent would be one of her important functions.

These tabulations, together with their interpretations by the superintendent, should be printed as a part of his annual report, and should be read by each patron who has an interest in the public schools. These tabulations of statistics will show to the stockholders the efficiency with which their business is being conducted.

CHAPTER V.

BUILDINGS AND MATERIAL EQUIPMENT.

Watler S. Monroe.

THE SCHOOL BUILDINGS.

IN CONSIDERING the buildings and material equipment of the Leavenworth Public Schools it is necessary to have clearly in mind, *first*, the past history of the city of Leavenworth and its public schools, and, *second*, the probable future school needs of the community.

The Third Avenue School was built in 1860, the Sumner School in 1866, the Morris School in 1867, Oak Street School in 1874, and the Maplewood building has been used as a public school for twenty-five years. Thus over three-fourths of the pupils in the elementary schools attend at buildings which have been built over twenty-five years, and approximately half of the pupils attend at buildings which have stood for nearly half a century.

This means that the majority of the school buildings were constructed when much less was known about school architecture than at present, and also when much less importance was attached to such matters as lighting, heating, seating, hallways, fire-proof construction, playgrounds, etc. In addition, these old buildings have been remodeled from time to time, and in two cases additions have been built. These conditions necessarily make the arrangement of some rooms and their lighting very poor.

The remaining elementary school buildings were constructed about ten years ago, except the Cleveland Park School, which is simply a dwelling house purchased by the Board of Education and adapted to the needs of a one-teacher school. In the newer schools better provisions have been made for the needs of the pupils.

The High School building was completed in 1905 and an addition was built in 1912. The building is poorly planned and represents very poor community foresight. Before the High School can become what it should be to the community of Leavenworth additional space must be provided.

THE BUILDING NEEDS.

The school census, the enrollment in the elementary schools and the High School, and the total enrollment, are given in Table VIII.

TABLE VIII.

School Census and Enrollment since 1900.

Year.	Census.	Enrollment.		Total enrollment.
		Elementary schools.	High School.	
1900-'01	6,963	2,575	176	2,751
1901-'02	6,865	2,417	164	2,581
1902-'03	6,646	2,480	174	2,654
1903-'04	6,615	2,342	229	2,571
1904-'05	6,695	2,282	255	2,537
1905-'06	6,746	2,853	325	3,178
1906-'07	6,871	2,753	348	3,101
1907-'08	7,174	2,650	273	2,923
1908-'09	7,080	2,721	283	3,004
1909-'10	6,850	2,601	304	2,905
1910-'11	6,871	2,981	326	3,307
1911-'12	6,859	2,465	377	2,842
1912-'13	6,649	2,335	460	2,795

The population of the city has been remarkably constant for twenty years (see page 14), and there is no reason to suppose that there will be any considerable change in the immediate future. The enrollment in the elementary schools has fluctuated from year to year, but the absolute change for the period represented here is slightly negative, and the age distribution of the school census shows the school population to be decreasing. (See page 34.) These facts, coupled with the population data and general observations, indicate that it is not probable that there will be any considerable permanent increase in the elementary-school enrollment in the near future. Since a maximum of approximately 3000 children have been cared for with slightly less than the present equipment of schoolrooms, it is fairly certain that the present schoolrooms will not be crowded in the near future.

On the other hand, the high-school enrollment has steadily increased except for two years, and the indications are that it will continue to increase until an enrollment of 800 or more is attained. Until such an enrollment is attained the Leavenworth High School can not be said to serve the community as it should. In view of the fact that the High School building is already seriously crowded (as the school is at present conducted), provision must be made for nearly double the present enrollment.

Thus the building problem for the city of Leavenworth involves an increase in the number of classrooms only in the case of the High School. The Sumner, Third Avenue, and Morris buildings are each approximately half a century old, and although the need for their replacement is not immediate if they are kept in repair, they can not be expected to stand forever. In the course of a few years some plans should be decided upon which would involve the erection of modern buildings to take their place. Also the Cleveland Park building is simply a small dwelling house in which a partition has been removed so that the building could be used for school purposes. This building is ill adapted to school work and should be replaced as soon as possible with a modern rural school building.

ANALYSIS OF BUILDINGS AND MATERIAL EQUIPMENT.

In Table IX an analysis of the buildings and material equipment and their relations to the pupils of the elementary schools is given.

TABLE IX.

	Oak Street.	Morris.	Third Avenue.	Maple-wood.	Frank-lin.	Jeffer-son.	Sumner.	Lin-coln.	Wil-son.	Cleve-land.	Averages of 83 buildings in 28 cities.
Number of pupils enrolled second quarter 1913-'14	411	380	446	262	124	143	185	127	39	28	.....
Total cubic feet building space usable	202,000	355,300	201,330	86,729	75,852	69,875	106,693	123,000	10,305	4,646	.....
Number of cubic feet per pupil	491	937	473	331	611	487	576	968	264	165	600
Total cubic feet building space used by teachers and pupils	194,000	333,548	180,445	67,233	71,201	57,152	99,236	92,460	9,899	4,473	.....
Number of cubic feet per pupil	472	877	404	256	575	398	536	728	253	159	.....
Total outdoor play space, square feet	12,450	67,818	15,302	72,877	27,814	22,778	37,000	13,244	34,151	25,427	.....
Number of square feet per pupil	30	178	34	278	224	159	200	104	875	908	155
Total indoor play space, square feet	.....	600	.....	600	600	712	.....	600	400	348	.....
Number square feet per pupil	.....	1.5	.....	2	4.8	4.9	.....	5	10	12.4	6
Total value of play apparatus	$27	$21	$21	$17	$20	$20	$25	$22	$20	$2	.....
Value per pupil	$0.08	$0.05	$0.04	$0.07	$0.16	$0.14	$0 14	$0.26	$0.52	$0.07	$0.22
Total floor space in recitation rooms	8,943	11,777	9,938	3,904	2,896	2,881	4,150	4,682	858	465	.....
Number of square feet per pupil	22	30	23.6	15	24	20.5	22.5	38	23	16.3	23
Floor space in corridors	1,924	2,338	3,422	1,640	2,521	1,061	2,846	640	158	113.5	.....
Number of square feet per pupil	5	6	8	6	21	7.5	15.4	5	4	4	8
Total window areas in recitation rooms	1,543	1,350	1,231	819	775	872	456	1,520	237	48.5	.....
Ratio of window area to floor area	1:5	1:9	1:12	1:5	1:4	1:3	1:10	1:3	1:3	1:10	1:5
Window area in corridors	92	1,932	89	110	237	140	260	236	60	16	.....

Ratio of window area to floor area	1:21	1:1 3	1:40	1:6	1:10	1:8	1:10	1:2.7	1:2	1:7	1:9
Total blackboard area, square feet	3,826	3,834	3,870	1,507	904	1,036	344	1,392	400	294	.....
Number of square feet per pupil	9.3	10	9	5.8	7.5	7	2	11	10	10	6.3
Number of drinking fountains	13	24	12	12	12	10	12	11	5	.....	.....
Number of pupils to each	32	16	36	22	10	14	15	12	8	.....	62
Number of toilet seats for boys	10	8	10	5	6	5	10	5	6	3	.....
Number of boys to each seat	18	24	19	29	10	16	9	13	3	5	20
Number of toilet seats for girls	12	16	12	10	6	5	10	5	6	3	.....
Number of girls to each seat	15	11	19	12	10	16	9	13	3	4	15
Width of urinal space in feet	7	12	12	14	12	15	4	9	16	5	.....
Number of boys in school per foot	26	12	12	14	6	4	23	6	1	3	6.5

The data for the building space used by teachers and pupils and the total floor space in recitation rooms suggest slightly crowded conditions in the Maplewood, Jefferson and Cleveland buildings; but when the writer visited these buildings the condition did not appear serious except in the case of the Cleveland School. A more adequate building should certainly be provided for this school.

PLAYGROUNDS.

The facts relating to facilities for indoor and outdoor play are among the most significant in the entire table. At the two largest schools, Oak Street and Third Avenue, the total outdoor play space per pupil is 30 and 34 square feet, respectively. This is entirely inadequate, and much less than the average for the 83 buildings. The outdoor play space is moderately adequate in the case of the other schools except Lincoln. However, at the Jefferson School the arrangement of the buildings and grounds is such that there is no play space for the girls, and much of the space at the Sumner School is not usable. The latter is partly true of the Morris School. In the case of these schools, and to a less extent the others, the efficiency of the playground could be much increased by grading and providing an appropriate surface. The equipment of the playgrounds is inadequate, being much below the average except in the case of the smaller school. During the present year, 1913-'14, a start has been made in equipping the playgrounds. It is recommended that additional equipment be provided as rapidly as funds can be secured and that additional outdoor play space be obtained for those buildings which show crowded conditions.

The Morris, Third Avenue, Sumner and Cleveland buildings are evidently poorly lighted, but some remodeling of the first two of these buildings is being done this summer which will increase the amount of window space. The corridors of the Oak Street and Third Avenue buildings are not well lighted. This is due to the fact that additions have been built onto the original buildings. A few features found in many of the 83 buildings studied are entirely wanting in Leavenworth; for example, school baths and stationary wash basins for pupils' use.

GYMNASIUM.

There is no gymnasium, though the need for one is acute. Our recommendations with respect to a gymnasium will be given in connection with the treatment of physical training. See page 176.

AUDITORIUMS.

The Survey Staff is unanimous in approving the present plans of the Board of Education for providing auditoriums in the Third Avenue, Oak Street and Morris buildings. See page 65 for recommendations for using auditoriums.

Detailed recommendations as to the remodeling of the present buildings or the construction of new buildings are not given because our knowledge and standards of school architecture are increasing so rapidly at the present time. Extensive remodeling of the present buildings would not be good business. When the city of Leavenworth is ready to replace the present old buildings by modern structures a competent architect should be secured.

SANITATION.

The High School, Morris, Third Avenue and Oak Street buildings have sewer connections. The other buildings have none, although three of them—Sumner, Lincoln and Jefferson—are sufficiently near the sewer. Toilet paper is furnished only at those buildings which have sewer connections. The three buildings, Sumner, Lincoln and Jefferson, should be connected with the sewer at once, and as soon as sewer connections are available the other buildings should be connected. The need is particularly pressing at the Lincoln building because of the small playground and the thickly settled district in which it is located. The Leavenworth Public Schools can render valuable service to the community by setting standards of sanitary cleanliness.

SEATING.

The dimensions of many of the classrooms and the position of the windows make impossible the placing of seats according to present-day standards. In a number of the classrooms the placing of the seats and the lighting are good. In a few these features are very poor. In all, except a few cases, the best is being made of an unfortunate situation.

Many of the seats have been inherited from the same generation as the buildings. They are nonadjustable and unsanitary. The superintendent stated in a report for 1912 that within the previous year "700 old nonadjustable and unsanitary seats" had been replaced by "700 adjustable and sanitary seats." This is a commendable improvement. In some cases even yet the seats are entirely unsuited to the pupils who must use them. In one schoolroom blocks are being used to make possible a resting place for the feet of some children. A room in the Jefferson School was visited in which scarcely a child could touch the floor with his feet when sitting erect. Such a condition should not be permitted to continue to exist. In the rooms which are equipped with adjustable seats, the seats appeared to be properly adjusted.

BLACKBOARDS.

The table on page 44 shows that adequate blackboard space is provided in most of the buildings in Leavenworth. The High School building is equipped with slate blackboards. In the other buildings, except Cleveland Park, the blackboards have been made by applying a liquid slate preparation to the plaster. In some of the buildings a fresh coat is applied twice a year, in others only once a year.

At best, this type of board is unsatisfactory, and in many of the classrooms the boards are very poor because of an imperfect plaster surface. The classrooms should be equipped with slate boards and sanitary chalk ledges, but in view of the fact that the buildings are old and the present boards are usable, there are other more urgent demands for improvements. Perhaps an exception should be made in the case of the rooms used for the departmental teaching of arithmetic. In any case, a fresh coat of the liquid slate should be applied oftener than at present.

FIREPROOF CONSTRUCTION.

The buildings are not fireproof. This is to be expected when the age of the buildings is considered. Fire escapes have been provided at all buildings of two stories or more, and the children were found well trained in fire drills with the exception of one school. These conditions minimize the danger from fire, but it could be further decreased by installing fireproof stairways in the three large buildings.

CHAPTER VI.

EDUCATIONAL EXPENDITURES.

Walter S. Monroe.

THE SCHOOL SYSTEM AS A BUSINESS ENTERPRISE.

JUDGED merely in dollars and cents, the Leavenworth Public Schools are one of the large business enterprises of the community. They represent an investment of approximately a quarter of a million and carry a yearly pay roll of over $65,000 and a yearly budget of approximately $125,000. It is thus worth while to inquire into the nature of this investment and compare the expenditures with those of similar communities.

HOW LEAVENWORTH SUPPORTS HER SCHOOLS.

There are in Kansas ten cities of the first class, *i. e.*, which have a population of 15,000 or over. In Table X we give some facts for these cities, taken from the report of the state superintendent for 1912.

TABLE X.

	School census.	Enrollment.	Tax levy.	Total valuation.	Possible revenue from direct taxation.	Possible revenue per pupil enrolled.	Value of school property per pupil.
Atchison	3,486	2,002	4.2	$16,042,373	$67,377.66	$33.66	$125.00
Coffeyville	3,676	3,406	7.0	11,541,115	80,787.70	23.72	53.00
Fort Scott	4,273	2,625	5.8	8,956,512	51,947.70	19.79	45.00
Hutchinson	4,240	3,491	4.3	20,644,512	88,771.35	25.43	143.00
Kansas City	25,314	14,593	5.5	92,919,110	511,055.05	35.02	95.00
Leavenworth	6,649	2,842	4.0	17,297,281	69,188.80	24.34	81.00
Parsons	3,190	2,529	5.6	11,593,311	64,922.48	25.67	158.00
Pittsburg	5,008	3,211	6.0	11,440,505	68,642.40	21.39	29.00
Topeka	11,641	7,936	4.7	50,950,000	239,475.00	30.17	109.00
Wichita	12,545	9,443	7.0	64,133,116	448,931.70	47.54	103.00
Average			5.4				96.00

These figures reveal the following facts: Leavenworth stands *seventh* in the number of pupils enrolled in the public schools, *tenth* in rate of tax levy, *fifth* in taxable valuation, *seventh* in revenue from direct taxation per pupil enrolled, and *seventh* in amount invested in school property per pupil enrolled. The average investment in school property per pupil enrolled in these cities is $96. Leavenworth has $81 invested for each pupil enrolled.

This means that, at the time these figures were taken, 1912, Leavenworth had the lowest tax levy for school purposes of the first-class cities of Kansas, and by so doing was below the average in providing buildings and material equipment and in its support of its public schools.

It is an indication of increasing community interest in the Leavenworth Public Schools to find that since these data were collected the tax levy has been raised to 5½ mills for current expenses and one-half mill for interest and bonds. This is within one-half mill of the limit set by law for the maintenance of public schools in cities of the first class. The possible revenue from direct taxation is now approximately $38 for each pupil enrolled. Comparative data are not at hand for the other cities, but it is fairly certain that Leavenworth has increased its comparative standing.

Although Leavenworth has not been supporting her schools as generously as most of the other first-class cities of Kansas, the tax rate in Leavenworth is unusually high. The citizens of Leavenworth pay the following taxes on each one hundred dollars valuation:

School	$0.60
City	.89
County	.64
State	.12
Total	$2.25

This means that out of each dollar paid in taxes 27 cents goes to the schools, 39 cents to the city, 29 cents to the county, and 5 cents to the state.

In Table XI the bonded indebtedness is given for the last twenty years.

TABLE XI.

Bonded Indebtedness of Leavenworth for School Purposes.

Remaining July 1,	1894	$95,874.13	
	1895	89,345.88	
	1896	83,120.26	
	1897	75,074.50	
	1898	68,734.05	
	1899	62,393.61	
	1900	59,223.39	
	1901	97,155.80	Issue $44,000
	1902	89,945.48	
	1903	79,291.66	
	1904	129,437.76	Issue $60,000
	1905	119,310.16	
	1906	103,534.01	
	1907	93,010.49	
	1911	69,367.01	
	1912	65,307.78	
	1913	60,307.78	

These figures show several things:

1. Bonds to the amount of only $104,000 have been voted within the last twenty years. The money from these bonds was put into buildings and equipment, and, with the exception of the $20,000 addition to the High School building, represents the total amount put into the permanent investment within that period. Thus only about half of the present school plant represents investments made within the last twenty years.

2. Within the period considered, the bonded indebtedness has never been less than that at the present year except for the single year 1900;

and at the end of the present fiscal year the bonded indebtedness of Leavenworth for school purposes will have reached the lowest mark within over twenty years.

3. With the present bond levy of one-half of one mill the present bonded indebtedness will be paid in less than twelve years.

4. As compared with other Kansas cities, Leavenworth has not been generous in providing buildings and material equipment for her schools. In 1910 Hutchinson, with a taxable valuation only slightly greater than the present taxable valuation of Leavenworth, was carrying a bonded indebtedness of $147,000. The taxable valuation of Kansas City, Kan., in 1910 was $71,341,895, or only about four times the present valuation of Leavenworth. The bonded indebtedness was $815,000, or thirteen times the present indebtedness of Leavenworth.

5. Leavenworth's position of seventh among the ten first-class cities, as judged with reference to value of buildings and equipment per pupil enrolled, is due to the age of the city and its static population. If Leavenworth were as new and as rapidly growing as many other Kansas cities, and if no more had been invested in public schools than has been, Leavenworth would doubtless stand at the bottom of the list.

Thus if Leavenworth should vote bonds to the extent of $150,000 or more within the next few years, the city would only be doing what other Kansas towns have already done and others are now doing.

ANALYSIS OF SALARY EXPENDITURES.

The large item of school expenditures is salaries. In Leavenworth it has been about three-fourths of the total regular expense, and in the future should bear even a greater ratio to the total. For this reason, and for others which will be made clear later, it is important to inquire what the community of Leavenworth is buying with this money.

No teacher in the seventh and eighth grades receives less than $720, and most of the teachers in these grades receive the maximum salary, $810. From these upper grades the salaries decrease with the grade until the first and second grades. The lowest salaries are paid in the second, third and fourth grades.

The average salary for the elementary teachers of Leavenworth, including principals, is $683. The average of 1102 elementary teachers in 30 cities near Chicago is $709.

TABLE XII.

The Distribution of the Teachers Accordiing to Salaries.

Number of elementary-school* teachers, with salaries.		Number of high-school teachers,† with salaries.	
Below $350	0	Below $500	0
$350 to $400	2	$500 to $600	1
400 to 450	6	600 to 700	0
450 to 500	4	700 to 800	2
500 to 550	5	800 to 900	2
550 to 600	8	900 to 1,000	7
600 to 650	2	1,000 to 1,100	8
650 to 700	3	1,100 to 1,200	1
700 to 750	6	1,200 to 1,300	0
750 to 800	0	1,300 to 1,400	0
800 to 850	23	1,400 to 1,500	0

* Supervisors of music and arts and crafts included.

† Includes four teachers who give half time to the elementary school.

Number of elementary-school* teachers, with salaries.		Number of high-school teachers,† with salaries.	
$850 to $900	0	$1,500 to $1,600	0
900 to 1,000	4	1,600 to 1,700	0
1,000 to 1,050	0	1,700 to 1,800	0
1,050 to 1,100	1	1,800 to 1,900	0
1,100 to 1,150	1	1,900 to 2,000	0
1,150 to 1,200	0	2,000 and above	1
1,200 and above	3		

If we exclude the principals and supervisors, the median salary of the teachers in the elementary school is between $650 and $700. This group includes only women. For a miscellaneous group of women teachers made up very largely of elementary school teachers, Dr. L. D. Coffman‡ has shown the median salary to be from $372 for one year of experience up to $629 for twenty-five years' experience. In comparison with these data, the salaries for teachers in the Leavenworth elementary school are superior.

The median salary of principals of north central high schools in cities from 15,001 to 50,000 population is given as $1800. The median maximum salary of teachers is $1500 and the median minimum salary of teachers is $500.§ The average salary is not given, but we may conclude that Leavenworth compares favorably with other cities of its class in point of salaries paid to high-school teachers.

TABLE XIII.

Cost of Instruction in High School. Leavenworth Compared with the Median for 24 Cities.

SUBJECT.	Average size of class.		Number of hours per teacher.		Number of students per teacher.		Teachers'** salary by subject.		Number of student hours for $1.00.		Cost per student hour.	
	M	L	M	L	M	L	M	L	M	L	M	L
English	21.2	24.3	23.3	20.0	139	146	$405	$457	22.2	19.9	$0.044	$0.052
Mathematics	21.0	23.3	23.3	20.0	138	140	475	474	19.0	17.6	.053	.056
History	20.6	25.6	23.0	17.2	127	133	465	465	17.0	17.0	.052	.058
Science	20.2	24.3	22.5	20.0	109	85	480	477	17.9	18.3	.060	.054
Modern Latin	17.3	21.3	23.2	20 0	128	113	427	440	16.2	15.4	.061	.064
Latin	17.3	19.1	23.3	20.0	113	115	440	520	15.4	13.2	.064	.075
Shop Work	14.5	12.3	23.1	31.0	77	69	570	378	13.0	18.2	.068	.054
H. Arts	16.5	22.5	24.3	29.2	98	198	388	413	20.7	28.6	.048	.035
Commercial	18.6	23.1	24.1	20.0	130	139	489	500	16.2	16.6	.064	.050
Normal Training	15.0	20.5	23.6	16.6	72	103	503	427	10.8	14.3	.092	.069

An examination of the facts given in Table XIII shows that Leavenworth does not stand conspicuously above or below the median of this group of cities.

* Supervisors of music and arts and crafts included.

† Includes four teachers who give half time to the elementary school.

‡ L. D. Coffman. The Social Composition of the Teaching Population.

§ Ibid., p. 111.

**Salary per semester.

CHAPTER VII.

THE TEACHING STAFF.

Walter S. Monroe.

THE TRAINING OF TEACHERS IN THE ELEMENTARY SCHOOL.

THE distribution of the teachers in the elementary school according to total years of training beyond the elementary school is given below:

Number of years beyond elementary school.	Number of teachers.	Number of years beyond elementary school.	Number of teachers.
1	0	7	5
2	1	8	2
3	4	9	2
4	11	10	0
5	18	11	1
6	20		

Nearly half of the teachers now employed in the elementary school have six or more years of academic and professional training beyond the elementary school. The average number of years of training beyond the elementary school is 5.4 for the teachers in the elementary schools of Leavenworth, and the average for 1102 teachers is 5.2 years.* This shows that in the past, with even a lower minimum standard than at present, Leavenworth has secured many teachers with college training or that the teachers have attended summer schools after their appointments. Thus the showing of the teachers, when judged by their total years of training beyond the elementary school, is relatively good.

In order to maintain this standing it will be necessary for the academic and professional standards for teachers in the elementary school to be strengthened in the near future. This can be done for those who enter from the normal training class of the Leavenworth High School by adding a year to that course. Such an addition is feasible and would make it possible for students to take adequate courses in domestic science and manual training. If music and drawing are introduced in the High School, as the Survey Staff recommends, these courses would be valuable for those preparing to teach. There would be opportunity for some additional study in the field of education. An alternative plan would be to require one or more years of work in a normal school. This plan possesses the advantage of bringing the prospective teachers in contact with an institution outside of their own community and with a larger number of teachers.

LENGTH OF SERVICE.

In Table XIV the number of years in the Leavenworth Public Schools is given for the teachers of the elementary school, omitting the special supervisors and the teachers of the industrial work.

* These and other comparative data which are used in this chapter were furnished by Dr. J. F. Bobbitt unless other acknowledgment is made. In all cases the data are for the year 1913-'14. The elementary teachers are all from school systems in cities averaging about the size of Leavenworth.

TABLE XIV.

Length of Service of Teachers in Elementary School.

Years in system.	Number of teachers.	Years in system.	Number of teachers.
0	2	17	0
1	8	18	2
2	4	19	1
3	7	20	1
4	5	21	0
5	4	22	2
6	2	23	2
7	4	24	0
8	2	25	1
9	3	26	1
10	2	27	0
11	1	28	1
12	2	29	0
13	3	30	1
14	1	31	0
15	0	32	0
16	1	33	1

Half of the teachers in the elementary school have been in the system seven years or more and the average term of service is 9.2 years. The average for 1102 elementary teachers is 6.9 years. This permanency of service offers the opportunity for improvement and development which would not be possible if the teachers remained in service only two or three years, but this opportunity carries with it the responsibility for providing facilities for the improvement of teachers in service.

IMPROVEMENT OF TEACHERS IN SERVICE.

Out of 62 teachers in the elementary schools only 14 have attended summer school within the last three years. Seven of this number attended six weeks or less, and only four teachers have attended 16 or more weeks. Of these 14 teachers who have attended summer school within the last three years, three have come into the system within the present year, and the terms of service of the others are as follows:

Years in system.	Number of teachers.
1	2
2	2
3	2
4	1
7	3
9	1

Among those attending summer school there is only one principal, and that one attended only six weeks.

In the High School ten teachers out of eighteen have attended summer school within the last three years. Only four teachers of this group (which includes the supervisors of music and arts and crafts) have been in the system more than three years.

Only one teacher reported correspondence work.

Similar data from other cities are not at hand for comparison, but in the absence of such data the writer believes that the teachers in the

elementary schools should attend summer school more. These data were submitted to several educators, and they all concurred in this opinion. Half of the teachers have been in the system seven years or more, and if we may assume that the percentage of attendance upon summer school has been constant for the last seven years, probably less than one-third of these teachers have attended school within that time. When we consider the development in educational theory and practice which has taken place within that time, the importance of an occasional term in school is easily recognized.

The responsibility for the present condition probably should not be placed entirely upon the teachers. Without adequate salaries teachers can not be expected to attend summer schools, but now that the community is paying better salaries, the community may reasonably expect greater efforts toward self-improvement on the part of teachers.

TIME GIVEN TO SCHOOL WORK BY TEACHERS.

The total school time, including both the time spent at school and the time away from school spent in preparation for school work, according to the teachers' reports, varies from 1800 to 3500 minutes per week, or from 30 hours to nearly 60 hours per week. A summary of the reports is given in Table XV.

TABLE XV.

Total Time Given to School Work by Teachers, Both Elementary and Secondary.

Minutes per week.	Number of teachers.	Minutes per week.	Number of teachers.
1800	1	2700	4
1900	0	2800	3
2000	0	2900	4
2100	5	3000	6
2200	5	3100	1
2300	2	3200	2
2400	5	3300	2
2500	1	3400	3
2600	4	3500	2

The most significant fact in this table is the great range of variation in the total school time. The class time is approximately the same for all teachers. Hence the difference in the total time is due primarily to the difference in the amount of time given to school work outside of the regular school hours.

The Survey Staff did not inquire into how the total school time was spent, but a few instances were noted of teachers spending time preparing material for the pupils when it would have been much better if the pupils had begun with the raw material. This suggests that perhaps the teachers who are spending large amounts of time on school work are not employing it as wisely as they might.

The system of records and reports used in Leavenworth Public Schools is moderately elaborate, and a few teachers mentioned to the writer that the keeping of the records made heavy demands upon their time.

Reports are now made quarterly, and in the elementary school they should not be less frequent. Adequate records are essential, but teachers should not be overburdened in this respect. The writer is not able to say whether they are at present or not, but suggests the question of how much time is required for the records and reports might be investigated. The disposition of a teacher's time is just as important as the amount of time given to school work.

CHAPTER VIII.

THE COURSE OF STUDY AND ITS ADMINISTRATION.

Walter S. Monroe, assisted by the Staff.

THE course of study of the public schools of any community is an outline of the education which the public schools give to the boys and girls of the community. This outline specifies how the boys and girls are expected to spend their time in school. So much time is given to reading, to grammar, to arithmetic, to history, to algebra, to manual work, to physics, etc. The outline also sets up standards of attainment in the various subjects.

In the present chapter we shall discuss the general principles of education and the educational needs of Leavenworth which must be considered in the making of an efficient course of study. In the following chapters the details of the school subjects will be considered.

THE BASIS FOR MAKING A COURSE OF STUDY.

What subjects should make up the course of study for the public schools depends upon what the public schools are expected to do for that community. The men and women of Leavenworth who are now carrying on the adult activities of the community will in time be replaced by another generation. If those who are now children are to undertake these activities and perform them with the highest degree of efficiency they must receive preparation. For discussing this preparation, we have adopted a classification of the activities of adults.

1. *Vocational activities, or those activities involved in providing the necessities of life.* Before those who are now boys and girls in the schools take their place in the occupations of the community, three types of preparation are required: First, they must have some concrete, practical experience in their respective occupations. Second, they must be acquainted with such technical and scientific knowledge as is needed for their occupations. Third, they must possess a body of general information.

A few illustrations will make this clear. Take the young man who becomes a clerk in a grocery store. Before he can render service to his employer which justifies a living wage, he must have some practice in wrapping up orders, making out sales slips, meeting customers, arranging goods, etc. In addition he must possess some technical knowledge of arithmetic, of qualities of foodstuffs, of the art of salesmanship, etc. And he will be still more valuable to his employer and will find more interest in his work if he is acquainted with the places which produce the foodstuffs he handles daily, with the problems of transportation, distribution, etc. Again, the girl who enters an office as a stenographer must have had practice in dictation and typewriting. In addition she must possess certain technical knowledge as to business forms. Her efficiency will be of a very low type unless she also possesses a considerable fund of general information.

2. *Avocational activities, or occupations of one's leisure time.* Our plan of living is providing more and more leisure time. This is not a mere accident, for leisure time is necessary to the life and well-being of every individual. But simply to have leisure time is not enough; it must be spent in wholesome activities. There is a wide range of such activities—outdoor sports and games; the propagation and cultivation of plants, particularly flowers; reading and study; producing and listening to music; enjoyment of art in its several forms; conversation; special studies in science (usually called a hobby); travel, etc. Two types of preparation are required for these activities. First, people must be caused to prefer them as occupations of their leisure time, Second, they must be trained to participate in them with at least a moderate degree of skill; for if skill is absent the desire will not continue to exist, and the cultivation of skill will tend to increase the desire.

3. *Civic and moral activities, or those activities which have to do with one's contact with his fellow men.* No one lives entirely apart from other members of the social group. Even on his own property the law does not allow him to do anything which will harm his neighbor. If he has a contagious disease he is placed under quarantine. If a property owner carelessly fails to keep his property painted and in repair the law does not interfere, but his neighbors may subject him to social ostracism; and they have a right to do so, because on account of his carelessness and indifference the civic quality of the neighborhood is lowered, and thus their enjoyment of living in the community as well as the value of their property is lessened.

There are many occasions when a person's conduct should be governed by consideration of the rights of others. Our contacts with other people are many. In such matters as health and sanitation and community pride they extend beyond our own family and social group to the entire community. In many instances they extend beyond the community to the state and the nation. A delicate personal responsiveness to the rights of others and to the social effect of our conduct is necessary and can be obtained only by preparation.

4. *Activities relating to personal health.* To keep physically well requires attention. One must have fresh air, sunlight, be clean, eat properly prepared and appropriate food, be clothed properly, and take exercise and recreation. Men and women who are not healthy are not a community asset. If they are so ill that they can not pursue their vocations, the community, some organization or some individual must support them. Even if not incapacitated, they are less efficient than they would be if they were in proper physical condition. Keeping one's self in good physical condition depends largely upon appreciation of the need, knowledge of the means, and habit of using the means. Training in childhood which will result in these three things is valuable preparation for adult life.

5. *Activities of social intercourse.* Society has adopted conventional rules for the guidance of individuals in the activities of social intercourse. These activities include letter-writing, conversation, meeting

strangers, entertaining in one's home, formal receptions, and public meetings. Conformance with the recognized standards in these matters depends upon, first, a knowledge of what are the accepted standards, and second, sufficient practice.

6. *Activities relating to home-building and parenthood.* The activities which are connected with a home are perhaps the most important responsibilities which come to a man or a woman. The social and economic changes of the last quarter of a century have made home-making and parenthood much more complex than a generation ago, and in addition have raised the standards. Therefore increased preparation for these activities is required and is justified by their importance.

7. *Religious activities.* Since the preparation for them is given by the church and the home, they will not be discussed here.

EDUCATIONAL AGENCIES.

Now that we have indicated the scope of the preparation which must be given to the boys and girls of Leavenworth before they can be expected to engage with efficiency in the activities which will be demanded of them—vocational, avocational, civic and moral, health, social, home-building and parenthood, and religious—it is appropriate that we inquire what agencies are available for giving this preparation. These are: the home; the vocation; the church; the social groups to which each individual belongs; institutions such as newspapers, theaters, Y. M. C. A., libraries, etc.; and finally, the public schools.

There was a time even in Leavenworth when the home, the vocation and the social group provided most of the preparation. But since that time in the early history of the community, two changes have taken place. The home, the vocation, the social group have decreased the preparation which they give the child. At the same time the scope of adult activities and the preparation required have increased. Thus a wide gap has been created between the supply and the demand. The Leavenworth Public Schools may well assume the responsibility of providing the needed preparation which is not being provided by the other institutions of the community.

TIME ALLOTMENT.

Table XVI gives in the first column the average per cent of time given in fifty cities to the subjects in the elementary school, and the second column the per cent of time given to these subjects in Leavenworth. A comparison of the two columns shows that in Leavenworth a smaller per cent of the school time is given to opening exercises, reading, language, history and civics, and recess (supervised play). A larger per cent of the school time is given to spelling, penmanship, arithmetic, drawing, and music. In Table XVII the distribution of the teaching time in the High School is given.

TABLE XVI.

Table showing distribution of time and salary, cost of instruction in the elementary school, not including special supervisors except in domestic science and manual training.

(The average for 50 cities is taken from the Fourteenth Year Book of the National Society for the Study of Education.)

SUBJECT.	Per cent of time.		Cost of instruction.				
	Average for 50 cities.	Leavenworth.	Total.	Per cent.	Third Avenue.	Oak Street.	Morris.
Opening exercises	3.5	1.8	$803	1.8	1.6	2.0	1.2
Reading	17.0	16.0	6,884	15.2	15.7	16.0	14.3
Language	11.0	10.3	4,476	9.9	11.0	14.8	11.8
Spelling	5.9	7.9	3,532	7.8	9.3	6.5	6.8
Penmanship	4.7	5.8	2,622	5.8	5.6	5.8	5.3
Arithmetic	12.7	15.4	7,290	16.0	17.3	15.4	18.0
Geography	6.1	6.6	3,014	6.7	7.9	7.8	7.0
History* and civics	4.6	1.7	922	2.0	3.6	3.3	3.1
Physiology and hygiene	3.6	2.2	990	2.2	2.0	2.5	2.8
Nature study		2.2	886	2.0	1.5	0.9	1.0
Drawing	5.3	7.8	3,600	8.0	6.6	7.7	11.7
Music	4.7	6.5	3,048	6.7	6.7	3.3	8.8
Manual training	4.1	3.1	1,445	3.2	2.1	2.0	1.7
Physical training	4.4	3.7	1,629	3.6	2.8	3.0	4.3
Recess (supervised play)	7.3	5.7	2,368	5.2	6.9	9.0	2.2
Domestic science		3.2	1,700	3.8			
Miscellaneous	5.1						

TABLE XVII.

Table Showing Distribution of Teaching Time in the High School.

SUBJECT.	Median for 24 cities.	Leavenworth High School.
English	17.2	16.5
Mathematics	14.0	16.5
History	10.2	6.6
Science	13.7	13.2
Modern languages	8.8	6.6
Latin	8.8	9.9
Household occupations	6.9	8.8
Shop work	7.5	11.0
Commercial	12.7	6.6
Normal training	4.4	4.4

*No note taken of historical reading in the classes in literature and reading.

THE VOCATIONAL NEEDS OF LEAVENWORTH.

The occupations of Leavenworth, given on page 20, have been classified by Superintendent Moore, as given in Table XVIII:

TABLE XVIII.

Classification of the Occupations of Leavenworth.

I. PROFESSIONAL.—Those who require as a basis for their college training such courses as are offered by the standard traditional High School:

Undertakers	11	
Pharmacists	15	
Civil engineers	3	
Doctors, dentists, specialists, lawyers, etc.	83	
Teachers	138	
Ministers	33	
Draftsmen and architects	3	
Total		286
Per cent	2.9	

II. ENTERPRENEURS.—Managers of extensive business who require at least a general high-school course as the basis of a wide experience or a technical college training:

Contractors (*a*)	5	
Managers (*c*)	20	
Dealers (*a*)	17	
Manufacturers	45	
Total		87
Per cent	0.9	

III. COMMERCIAL SKILL.—Those who require a commercial course of two, three or four years, together with general training such as is offered in the Leavenworth High School:

Accountants	254	
Salesmen and agents	175	
Railroad employees (*a*)	41	
Stenographers and reporters	93	
Contractors (*b*)	54	
Managers (*a*)	249	
Clerks (*a*) and (*b*)	664	
Dealers (*a*) and (*b*)	328	
Liverymen	8	
Hotelkeepers (*a*)	7	
Real estate and insurance	57	
Publishers	15	
Restauranteurs	18	
Total		1,963
Per cent	20	

IV. INDUSTRIAL SKILL.—Those who require at least an elementary education as it is offered in the departmental schools of Leavenworth, together with the elements of industrial training. In Leavenworth these workers seem to divide into two groups, as follows:

1. Industries for which the Leavenworth Public Schools provide or partially provide industrial training:

Machine operators (*b*)	184	
Woodworkers	475	
Milliners	15	
Seamstresses	185	
Cooks (*a*) and (*b*)	47	
Total		926
Per cent	9.4	

2. Industries for which the Leavenworth Public Schools offer no industrial training:

Chauffeurs	9
Bookbinders	8
Machine operators (*a*)	103
Painters and decorators	120
Photographers	12
Iron workers	125
Silver- and goldsmiths	10
Cement workers	93
Plasterers	92
Stone cutters	10
Bakers	12

2. Industries for which the Leavenworth Public Schools offer no industrial training:

Electricians	27	
Engineers and firemen	134	
Shoemakers	31	
Plumbers and fitters	52	
Nurses	44	
Barbers	76	
Farmers, gardeners, etc.	139	
Tailors	53	
Butchers and meat cutters	34	
Printers	44	
Musicians	22	
Managers (*b*)	28	
Total		1,278
Per cent	13	

V. SLIGHT SKILL.—Those who require at least an elementary education of a general nature, consisting of practical courses in (1) applied arithmetic, (2) applied elementary English, (3) elementary science, both physical and biological, (4) manual and industrial arts, (5) arts and crafts, both practical and appreciative, (6) elementary social science, including history and citizenship:

Telephone operators	91	
Railroad employees	164	
Soldiers	135	
Laundresses	88	
Confectioners and hucksters	84	
Domestics	162	
Messengers	22	
Liverymen (*b*)	92	
Rooming-house keepers	46	
Housekeepers (hired)	10	
Mail carriers	26	
Laborers	1,833	
Federal guards	93	
Miners	623	
Total		3,419
Per cent	35	

VI. MISCELLANEOUS:

Unclassified	858	
Apprentices	444	
Widows	945	
Students	24	
Total		1,866
Per cent	19	
GRAND TOTAL		9,825

PREPARATION FOR VOCATIONAL ACTIVITIES.

Superintendent Moore has made the following observations concerning the facts of Table XVIII:

The above investigation shows that the Leavenworth Public Schools are prepared fully to accommodate only two of the great divisions, namely:

	Number.	Per cent.
The professional division	286	2.9
The enterpreneurs	87	.9

With some enlargements, both in plant and faculty, our commercial department in the High School would become an adequate preparation for the—

Commercial division	1,963	20

Our courses in manual training, domestic arts and sciences, and arts and crafts provide perhaps about 80 per cent of an adequate preparation for—

Division (1) industrial skill	926	9.4

With our new arrangement of the department buildings, our elementary schools will adequately provide, after some reorganization of subject matter and the addition of some apparatus, for a basis for all classes and perhaps a sufficient school education for—

The slightly skilled division	3,419	35

There remains a group of the unclassified, the widows, the students, and a number listed in the directory as apprentices, making in all—

A miscellaneous group..... 1,866 19

Excepting a basal elementary general training, our schools do not provide training for—

Division (2) industrial division..... 1,278 13

This appears to be a just general estimate of the preparation for vocational activities which Leavenworth is providing at present. The school can not conveniently supply concrete, practical experience in such vocations as manufacturing stoves and ice, paperhanging, bricklaying, etc., but the school can economically supply the technical and general preparation even for these vocations. In the case of other vocations, such as bookkeeping, stenography, teaching, carpentering (simple phases), cabinetmaking, dressmaking, gardening, etc., the school can easily provide much of the necessary practical preparation as well as the technical and general preparation. Much the same thing is true for the other classes of activities. Some of the preparation can be given best by other institutions, but for the giving of some the public school is the most suitable agency.

In the elementary school courses in sewing are now given for girls in the fifth, sixth and seventh grades, and cooking in the eighth grade, one period of eighty minutes per week being devoted to this work. During the same period the boys of the seventh and eighth grades have bench work, and the fifth and sixth grades have preparatory courses in cardboard and wood. The provision which Leavenworth has made for these subjects probably compares favorably with that in other cities, but the Survey Staff believe some extensions of this work could be made with profit. For example, the boys in the sixth, seventh and eighth grades might be encouraged to bring broken chairs and tables and be taught to mend them. They should be taught to mend fences and hang gates, build chicken coops and small sheds, reglaze broken windows, make and hang screen doors, and to do the numerous other odd jobs which call for an intelligent use of tools.

A similar plan could be carried out for the girls, providing instruction in plain cooking, sewing, and housekeeping, which would not only lead to more efficient home-keeping, but also help those who wish to go into domestic service. The sewing courses might lead in due time to thorough preparation in millinery, dressmaking, and tailoring, the latter open to boys as well as girls. In the Morris and Lincoln schools there is now available building space for this work, and it would be particularly valuable to the children attending those schools.

SCHOOL GARDENS.

Preparation for gardening, which is an important occupation in Leavenworth, will require school gardens. The work in nature study does not now extend beyond the third grade.

School gardens are no longer an experiment, and besides providing

vocational preparation, they are very valuable in another way. The Commissioner of Education says in his recent report (1913):

"There is need of suitable educative, purposeful, productive occupation for millions of school children in our cities, towns, manufacturing villages and suburban districts who now have not proper employment out of school hours. . . . Home gardening done by the children under the direction of the schools seems to offer what is needed. In all of the manufacturing villages, suburban communities and smaller towns, and in the outskirts of the larger towns and cities, there is much valuable land in the back yards, vacant lots and elsewhere which might be used for this purpose. In every school in a community of this kind there should be at least one teacher who knows gardening both theoretically and practically. This teacher, who should, of course, be employed twelve months in the year, should teach the elementary sciences in the schools during school hours, and should out of school hours direct the home gardening of the children between the ages of 6 or 7 and 14 or 15."

The Survey Staff believes that there is need in Leavenworth for just this type of work.

Geography and history contribute to the general information which is needed for vocational activities. In comparison with the average for other cities, the provision for history appears inadequate. A course in elementary science would furnish valuable technical information. This should include more than the school gardens which were mentioned above. Such a course is being planned for next year.

But it must be remembered that the function of the public school includes much more than preparation for vocational activities. If it is to fulfill its total function it must provide preparation for the other classes of activities which we have enumerated.

PREPARATION FOR AVOCATIONAL ACTIVITIES.

Preparation for avocational activities is provided for in part by reading, music, drawing, and supervised plays and games. Other activities of the school, such as the literary, dramatic and social, also contribute. The extension of the course in nature study which has been recommended will strengthen the preparation for this type of activities. It can be still further strengthened by more adequate provision for plays and games and their supervision, especially supervision of playgrounds during vacation. For other recommendations see the reports on literature, drawing and physical training.

PREPARATION FOR CIVIC AND MORAL ACTIVITIES.

The Survey Staff believes that the most efficient preparation for moral activities can be given incidentally. Morals and manners are listed in the printed course of study as an incidental minor for all grades, but the teachers reported no time given to the subject. This is as it should be. There are three sources of moral training: first, the activities of the school; second, the methods of teaching; and third, the course of study.

The effectiveness of this incidental teaching in Leavenworth was clearly evident. The pupils were exceptionally courteous to members of the Survey Staff as well as to their teachers and playmates. The buildings, inside and outside, were exceptionally free from markings by pupils; and this freedom is an index of the moral tone of the school.

School assemblies offer an opportunity for developing a social consciousness. With the three auditoriums which are now planned for next year there will be increased opportunity for this valuable phase of school work. The per cent of time given to opening exercises in Leavenworth is less than half of the average for other cities. It is recommended that the time for this purpose be increased. For additional recommendations for school assemblies see page 65.

History and civics contribute directly to the preparation for civic and moral activities. Their value in this connection is another reason for recommending that additional time be given to these subjects. For the recommendations concerning literature see page 147.

In addition to these facilities for moral training, the Leavenworth public schools have a system of bank savings. This tends to cultivate thrift and, more important, a sense of value and the recognition of property rights. Bank savings have also a bearing on the preparation for vocational activities.

PREPARATION FOR ACTIVITIES OF PERSONAL HEALTH.

Preparation for the activities relating to personal health is provided for by physiology and hygiene, physical culture, and plays and games. The Survey Staff believes that this work should be extended. Specific recommendations are given in later chapters. See pages 113 and 141.

PREPARATION FOR ACTIVITIES OF SOCIAL INTERCOURSE.

The group activities of the school, such as athletic clubs, literary and dramatic societies, boy scouts and similar organizations, etc., furnish preparation for these activities. Some preparation is given incidentally in the activities of the classroom and playground. The auditoriums will make the extension of these activities possible. See page 65 for recommendations.

PREPARATION FOR ACTIVITIES OF HOME-BUILDING AND PARENTHOOD.

Partial preparation for these activities is given by the courses in manual training and domestic art and science. The extensions recommended for these courses will provide additional preparation. See pages 106 and 164. Courses in household accounting and hygiene (in the High School) are also recommended.

BANK SAVINGS.

The system of bank savings in the Leavenworth Public Schools was begun about three years ago. Briefly the plan is this: Any bank may send a representative once every two weeks to each school building to receive deposits, the schedule being approved by the superintendent, and the representatives of no two banks appearing in any school on the same day. The banker opens his bank in the hall or principal's office between the hours of 8 and 8:30 a. m. Each child deposits at that time, if he so desires, and receives a deposit slip. Two of the local banks have taken advantage of the opportunity offered. Both signify their intention of continuing the plan, although they agree that it is not self-supporting. Incidentally it may be noted that this is typical of the spirit of coöperation which should exist between business and the public schools.

During the first three-quarters of the present school year 3384 deposits were made by the children in the elementary schools. The number of depositors and the total amount of the deposits were not obtained because it is believed that the number of acts of depositing is more significant.

THE USE OF SCHOOL ASSEMBLY HALLS.

By September, 1914, assembly halls will have been provided at Morris, Third Avenue and Oak Street schools. It is hoped, also, that these halls will be used frequently in the evenings for parents' meetings and neighborhood discussions and for social entertainments. Rightly used, such a gathering place becomes the very center of the social and intellectual activities of the school and the community. In addition, the entire school should assemble every day for a period not longer than thirty minutes. Because of the necessities of the case, most of the day in the modern school is spent in isolated groups, where the special needs of children of varying ages can be properly ministered to; but it is also essential for unity and growth into good social and civic consciousness that these groups should get together at least once a day; that they should have a time to coöperate for the pleasure and well-being of the whole; a place to contribute and share their best and choicest experiences. Here the child will learn that he is a member of a school community, and that as such he has duties as well as rights and privileges. Here, without exception, each child should take his turn and do his share in making these daily assemblies the most useful and delightful periods of the day. Here the children and teachers may learn to know every one in the school. The little ones learn much from the older ones, and the older ones gain real sympathy and appreciation for the little ones, and a spirit of helpfulness and protection results that is in marked contrast to the attitude which too often exists between the older and younger members of a school.

To establish such a practice in the school takes time and steady, persistent effort, perhaps for more than a year, but the results more than repay for the energy and effort expended. The older children gradually realize the value, even to themselves, of the clear thinking and definite preparation that is needed before they can be understood by an audience ranging in age from children of kindergarten to the adults—members of the faculty. It is not a small thing for eighth-grade boys and girls to succeed in making a current-events exercise, through the use of maps and pictures, intelligible to younger children, and at the same time interesting to the rest of the audience; or for a high-school group in a chemistry exercise, through carefully made models, to show the proportion of the different gases that make up common air. In the latter example, perhaps they may not succeed in making the little children understand all about it, but certainly their expression succeeds in clarifying this work in the minds of the pupils giving the exercise, and the little children get out of it the spirit and influence of this serious social effort.

For the little children the good effect of the daily meeting is perfectly obvious. It is the greatest possible incentive to them for the best expression; the greatest possible opportunity for drill under good motives; the greatest possible means of overcoming self-consciousness and

contributing one's self to the community good. Miss Martha Fleming, of Chicago, who has had wide experience with children in such daily meetings, says that the conditions surrounding these exercises are ideal for the cultivation of the powers of expression—"an audience and a child with something to tell"—and that they are of untold educative value, since they present an opportunity and make a natural demand for a great variety of expression. The child plans, he speaks, he acts, for the pleasure and enlightenment of other people. Children accustomed from early childhood to an audience learn to think and speak upon their feet, so that people may hear and understand them. It is the habit of meeting an audience *every day from the beginning* that tells; that gives power and skill and self-possession. Children trained in this way never experience the agony of self-consciousness that it means to those educated in self-repression instead of self-expression.

It should be remembered that while pupils constantly gain useful information in these exercises, the gaining of knowledge is not its sole end. Indeed, it is not even its chief purpose; it is rather an attitude of appreciation which is cultivated in the children through emotions which are aroused, through ideals which are engendered, through the daily habit of singing together beautiful songs and of hearing bits of inspiring literature, and, either as performer or as listener, of contributing each one his best to the common good. In short, we believe that the morning exercise, at its best, is a soul-expanding and heart-warming process which contains the very essence of normal and natural social education, and that it is the factor in school life which works most directly and effectively toward the good citizenship which is the goal of all our schools.

THE METHOD OF THE SURVEY OF THE SCHOOL SUBJECTS.

The courses of study for particular subjects and the teaching of them were examined in three ways:

First. Actual visitation of teachers in their classrooms. The teachers were requested to proceed with their regular work, and the several members of the Survey Staff entered classrooms unannounced. Every teacher above the third grade was visited for at least a full class period, and a number were visited more than once. The work in the first three grades was surveyed in a somewhat different manner, but every teacher was considered.

Second. Numerous conferences were held with teachers to determine their purpose and point of view as well as the course of study as actually taught. These conferences were supplemented by a general request to all teachers in the form of a "questionnaire to ascertain method of teaching," which contained directions as follows:

Select a topic which you actually taught during the past quarter and which you consider you taught effectively.

Describe below your method of teaching the topic, including:

(*a*) The pages in the text.
(*b*) The assignments which you made.
(*c*) The order in which you took up the topic.
(*d*) Your method of presenting it.
(*e*) Why you consider your teaching of the topic effective.

This topic should cover at least one whole recitation and not more than five. If you teach more than one subject, select a topic from each. Be brief and specific.

Third. Tests for which comparative data were secured were given in arithmetic, handwriting, spelling, grammar, and algebra.

In observing the classroom work use was made of the following observation blank:

OBSERVATION BLANK.

Name of teacher..... Building.....
Grade..... Class in..... Time of day.....
Lesson on..... type of lesson; study, development, application, recitation, review, drill.
Approximate number in class.....; boys.....; girls.....
Teacher's knowledge of—
Subject matter: Excellent, good, fair, poor.
Organization: Excellent, good, fair, poor.
Function of subject matter; Excellent, good, fair, poor.
A brief narrative of what was done:.....
.....
Results as judged by the effects upon the pupils—
1. Motive .....
2. Evaluation .....
3. Organization .....
4. Initiative .....
5. Acquisition (do pupils know the subject matter?).....
Was the instruction on the lower plane, attempted higher, or higher?.....
Do the pupils appear to like the subject? Like, indifferent, dislike.
Per cent of pupils actively attending lesson..... Why active?.....
Who is doing the work—teacher or pupils? Was the subject matter suitable to the maturity and past experience of the pupils?.....
What use does the teacher make of the text?.....
Assignment, how made?.....
Discipline and classroom routine: Good, fair, poor.
Type of discipline: Military, personal, social.
Remarks: .....

For using the blank the following directions were prepared:

In judging the motive, the question is, What *kinds of motives* are moving the pupils to action? Are they *artificial incentives; e. g.*, a reward, fear of punishment, respect for the authority of the teacher or school, the competition of the social group, desire to make a good showing, etc.? Or are they *real motives; i. e.*, do the pupils appreciate the intrinsic function of the subject matter and are they developing a liking for the subject because they are coming to realize the usefulness of the subject?

In judging of the *consideration of values by pupils*, it should be noted whether the teacher conducts the class period in such a way as to require the pupils to consider relative values, as well as whether the pupils exhibit ability to evaluate.

The above paragraph also applies to the *attention to organization by pupils*. Whether the pupils make an attempt to organize depends upon the type of questions which the teacher asks. If the teacher asks only detailed questions there is no need for organization.

Under *initiative*, the questions are: Are the pupils planning for the things which they do, or are they simply following the detailed directions of the teacher? Does the teacher permit opportunity for the exercise of initiative, or does she make the exercise of initiative impossible because of her detailed specifications both in assignments and in conducting the recitations?

In determining the "plane" of instruction, one should have in mind primarily *what the pupils are actually doing*, and *not* what the teacher may do.

If the teacher is taking the lead, is in the foreground, if the pupils are moved by artificial incentives, if the questions call simply for detailed facts, and if the class period is spent by having the pupils recite to the teacher what they have read, the instruction is on the lower plane.

On the other hand, if the pupils are taking the lead, if the teacher is in the background, if lines of thought are pursued in which data are evaluated and organized, and if the pupils are doing this because they appreciate the function of the subject matter, the instruction is on the higher plane.

CHAPTER IX.

THE PRIMARY GRADES.

Flora J. Cooke.

THE METHOD OF SURVEY.

THE following report is based upon a week's observations in the primary grades of the Leavenworth Public Schools. The first three grades in seven schools were visited, and twenty of the thirty primary teachers were observed in not less than two and not more than three lessons. In addition to this, these teachers also submitted programs of work, analyses of lessons, and specimens of children's work for examination.

The principals all showed the deepest interest and concern in the welfare of the teachers, and the teachers expressed enthusiastically their appreciation of the help received from the principals and from the superintendent. The relations between the children and the teachers were also genuinely good in spirit. During the entire week I heard no harsh word spoken, and saw no unruly child in any school, while marks of interest—even of affection—existed in every part of the school system.

DISCIPLINE.

There are two types of school discipline. *One* may be described as *military*. Under this type there is absolute obedience to authority with very little exercise of initiative on the part of the pupils. The activities of the schoolroom are performed in response to signals. For example, all children stand when called upon, and remain standing until excused by the teacher. There is a uniformity of response on the part of the part of the children to the demands of the teacher which is depressing to an observer used to great freedom in the activities of children. The *other* type may be called "*socialized*" school discipline. There is less uniformity, more initiative on the part of the children, sufficient freedom and opportunity to carry out simple projects, to make childish mistakes. More emphasis is placed upon social motives.

Opinions differ as to which type of discipline is preferable, but the writer believes that to the excellent results which are now obtained in the primary grades in Leavenworth, others might be added by discarding somewhat of the military system which prevails and by appealing more to social motives and allowing opportunity for initiative in some activities.*

The superintendent and principals stated that much individual freedom was given to the teachers of experience and ability, and it should be understood that the superintendent and many teachers are in hearty accord with many of the changes which are recommended in this report. In fact, several improvements here suggested have already been planned for; among these are plans for larger and better-equipped playgrounds for certain schools, and for several assembly halls.

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* The Survey Staff indorses this recommendation and believes that it might be profitably applied in all grades of the elementary school.

Only the four so-called "major" subjects from the course of study will be analyzed with any degree of fullness.

READING.

This is a "major" subject in all of the primary grades. In the first grade the natural "look and say" method of teaching reading is emphasized. The teachers are warned against the too early analysis of words into sounds, and also against permitting the mechanics of reading to crowd out interpretation. The worst evil of the course of study in reading is the required textbooks which are used. The children are condemand to Van Ambaugh's primer for the first three months, and to the Wooster series of readers for the next three years. These books are demanded by the state law, and though they are not worse than many others, they are of the usual scrappy, unrelated, uninspiring kind, the sole use of which is to give the children the conventional vocabulary of the first years in school. The impositions of such poor and meager reading material should not be tolerated. The teachers should convince the parents that this uneducative matter falls far below the ideal, and both parents and teachers should put forth a united effort to have the school-book law of Kansas repealed. The new law should be flexible enough to allow, in a community the size of Leavenworth, a committee of carefully chosen, experienced primary teachers to select the reading books for the primary grades. This plan should include the supplementary books as well as the readers. Their choice should, of course, be approved by the superintendent of schools. If a uniform course is necessary throughout the state, a joint committee of primary teachers and superintendents should pass upon the series of books.

In addition to given textbooks, it is usual to plan for four or five sets of readers for supplementary reading; but although it has been demonstrated beyond the shadow of a doubt that children who have opportunity for a wider range of reading learn to read more quickly and that they read more intelligently than those confined to one reader, Leavenworth has not yet given its children this advantage, presumably because of the restrictions made by the state law. Therefore, the Board of Education of Leavenworth is urged to consider this plan, and also the *reading leaflet plan*, which has been used with excellent results in the Francis W. Parker School of Chicago, in the Ethical Culture and Horace Mann schools of New York, in the De Kalb Normal Practice School, and in many other places throughout the country. This plan was started in the Cook County Normal School under Colonel Parker, and consists of printed reading leaflets for use in the primary grades; these to be used largely in place of supplementary reading books. In order to do this, a good but not elaborate printing outfit should be purchased by the Board of Education, and some teacher who has had experience in printing should be employed to give certain hours each day to the work. Printed supplementary reading leaflets and dictionary words can then be freely used by the children in the primary grades. These are especially useful in the first two grades, where good reading material is most scarce. (A school paper or magazine, managed entirely by the upper-grade pupils,

is also an educative possibility connected with the printing press.) These leaflets should be set up in large-sized type and printed by the pupils of the seventh and eighth grades in the public schools under the direction of the teacher-printer.

Each school in Leavenworth is adjacent to some natural and educative type of landscape, or to some industrial or manufacturing plant that is worthy of study. The Franklin School is situated in a beautiful grove of trees, is accessible to a most interesting ravine, and Pilot Knob is almost in its front yard. There is also a large bridge works in the vicinity. The Morris School is near the city waterworks and the river, and the Sumner School has for its neighbor the excellent Parker Amusement Company. What better work in reading, writing and spelling could the children have than composing material for leaflets, expressing their own observations, impressions and bits of acquired knowledge concerning the natural phenomena and industrial activities which exist in Leavenworth, and which consciously or unconsciously influence their lives? Through the exchange of these leaflets between the schools the children could be bound together by a common knowledge and interest in their civic and natural environment. For instance, they would learn what flowers come first in the north ravine, how many kinds there are, and how they differ from those which grow on the slopes of Pilot Knob; or whether the ravines in the north and south parts of town have been formed in the same way, and where the raw materials come from which are used in the bridge works. This live form of reading and composition appeals to every child, as does the writing of a book giving the early local history; in fact, the plan is excellent from every point of view. In this piece of community service the older pupils get training in the correct use of English, in the printing craft and in practical citizenship, and the younger children gain economically, under the stimulus of interest, not only the same formal results in vocabulary (which usually must be secured by much drill in stupid unrelated lessons), but also the richness of experience which comes to children from the habit of daily expressing their own ideas and emotions in the best possible form and under the supervision of a wise and interested director. Experience has proved that the vocabulary which the children master in this kind of work does not differ greatly in the number or kind of words from that gained through the ordinary drill process with the textbook for a basis, but the educational content of the work is vastly superior and well worth the effort involved.

This plan is as expensive as that of supplying supplementary readers, but since scarcely any first reading books appeal to a child's interest or intelligence except through pictures (the Free and Treadwell Primer is a brilliant exception), and since Leavenworth has not yet spent money upon such books, the writer recommends that this leaflet plan be given a trial, believing that the plan will tend to place the schools of Leavenworth in the front rank with other schools that are struggling to get the best things for children.

Some teachers in Leavenworth are already attempting to do this type of work under great handicap, using large rubber type for printing, but this takes too much time for frequent use, so that it can never be an

effective or flexible medium of expression, and the large charts which result are not easy to exchange among the schools. Under the leaflet plan, news can be exchanged between the schools, games explained, and special school celebrations described; the form and vocabulary used in the leaflets being limited both by the skill of the children composing them and by the ability of corresponding classes of children in other schools who will read them.

From a formal point of view, the reading in the Leavenworth schools is good, but there is a deplorable waste of time on account of the poor quality of the reading material used. The intelligence of the children requires more exercise upon material which demands keen observation, initiative, good taste, good judgment, and a genuine effort in self-expression.

WRITING.

Writing is the second "major" course in the Leavenworth schools. Of the *penmanship* there is little to say beyond the fact that the results are good. This would be expected from the habit of daily drill.

Writing as *means of expression* seems to receive little attention in the primary grades and is not mentioned in the course of study. Almost no original expression in composition was seen in the first grade, and very little in the second or third except isolated sentences in connection with the reading lessons, which were written upon the blackboards by the teachers. The writer requested the teachers of the second and third grades in all the schools to have the children hand in written sentences in response to the question, "What do the children in Leavenworth like to do to have fun?" The period to be given to this work was not to exceed thirty minutes. From the second grade 180 papers were received. The work came from seven schools—from the Third Avenue, Franklin, Maplewood, Sumner, Morris, Oak Street and Jefferson schools. The largest class represented had twenty-nine pupils and the smallest fifteen. The uniform type of answer was remarkable. The following examples taken at random from three schools are thoroughly typical of all the papers from the second grade.

A typical paper from the Third Avenue School set:

I like to play hide-and-seek.
I like to play shadow tag.
I like to play bean bag.

A typical paper from the Morris School set:

I like to write.
I like to sing.
I like to eat.

A typical paper from the Jefferson School set:

I like to play tag.
I like to play with my doll.
I like to play house.

There were 166 papers which consisted of just three sentences of this nature, and in eight others there were more sentences, but of the same kind. In all of the papers the penmanship and spelling were good, and almost all of the sentences began with capitals and ended with periods. In

the six papers showing more originality in the children's expression the spelling was good, but not so perfect as in the other papers. Four of the best papers were from one room in the Jefferson School. Three of these are as follows:

HOW I LIKE TO HAVE FUN.

This summer we are going into the woods.
We will take our lunch with us.
We will wade out into the water and go boat riding.
We would pick lots of flowers.

HOW I LIKE TO HAVE FUN.

I like to have some little girl to come and play with me.
Some day I will have a party out in the grass.
I will be glad when papa comes home with a bag of candy.

HOW I LIKE TO HAVE FUN.

I like to have fun playing baseball.
I like to have a store of my own.
I would like to have fun guiding an auto.
I would like to have fun playing soldier and Indian.

The most original paper handed in was from the second grade, as follows (it came from the Third Avenue School):

I like to play cowboy best of all the games in the world.
I get on my rocking horse and I gallop away to get cows.
I play it in winter and summer both.
It is lots of fun.
I play it with Lewis.

From the third grade 141 papers were received from the seven schools. With the exception of one school, of 29 children, in which nearly all the papers differed in form and were exceedingly good, there was no marked improvement over the papers of the second grade in penmanship, spelling, composition, or content. Of these papers 112 were almost identical with those of the second grade; 104 of these had each but three sentences, of which the following two from the Maplewood School are good types:

I like to play baseball.
I like to play marbles.
I like to spin tops.

I like to go to school.
I like to play with dolls.
I like to read story books.

Eight other papers were very similar to these, but had more sentences. From the Oak Street School, where the teacher seemed to have made a different demand upon the children, and where I am sure the children must have the habit of using greater freedom in written expression, I have selected four papers. The spelling in this room was not quite so good in all cases, but as several of the children were evidently foreigners, that could be, in a measure, naturally accounted for, and the gain seems to the writer greatly to overbalance the loss. From Oak Street School:

FIRST PAPER:

I have fun playing tag with my dog.
I play that the swing is base, and I play that my dog is *it*.
I have fun playing school with my dolls.

I play that I am teacher and whip my dolls sometimes when they are bad in school.

I have fun playing Santa Claus. I play that I am Santa Claus and I drop a few things behind me.

SECOND PAPER (from a little Italian boy who has been in this country only two years):

I have fun to the river, and I saw there three little frogs.

And they jump up and down, and when I was going to catch it he skip away.

And nother time I went to the "krik" and I saw a little babe snack, and he just sing just like bird.

THIRD PAPER:

I have fun climbing hay stacks when I go to my grandmother's in the winter. When my cousin and I climb the haystack we take a ladder, and then slide down the other side, and cover each up in the hay all but their head, and have fun that way.

Several other children of the twenty-nine mentioned explained games in full, told how they acted out stories, and described many interesting and amusing incidents. They showed spontaneity and joy in expression which was worthy of the consideration of all the other primary teachers.

In summing up, it is just to say that the results from this one test would indicate that the emphasis in writing has been placed too largely upon the forms of expression in the schools, and that while the penmanship and spelling are good, the conclusion is that these good formal habits should be utilized much more generally in the expression of thought. Of course the fault in this case may have been partly because of the way the writer's question was given, or the way the teachers limited the children in their answers to the question, but in any case there is not enough difference between the second- and third-grade papers in normal development to be satisfactory. The papers in one school showed that children in the third grade are capable of greater freedom in expression, and the uniformity in all the other papers certainly gives the impression that mere formal results have been overemphasized in the schools.

SPELLING.

Spelling is the third "major" subject of study in the primary schools. The writer asked for written papers showing the results of one day's regular spelling lessons in the second and third grades. The record from these grades in the seven schools is tabulated below.

Second-Grade Record.

SAMPLE LIST OF 25 WORDS.

glove	among	teacher	over	fourteen
match	chair	basket	been	which
papa	busy	these	slow	place
fence	hole	sugar	mama	button
bright	pencil	throw	happy	color

SAMPLE LIST OF 10 WORDS.

quick	read	shelf	spoon	teacher
window	write	play	turn	

All the other lists were similar to these, consisting of words from the regular readers which were already in the children's speaking vocabulary.

TABLE XIX.

Second-grade Spelling.

NAME OF SCHOOL.	Number of pupils in grade.	Number of words in list.	Papers—number correct.	Papers with one word misspelled.	Papers with two words misspelled.	Papers with three words misspelled.	Papers with four words misspelled.	Papers with more than four words misspelled.
Third Avenue	27	20	19	6	.....	.....	1	1–6
Franklin	18	10	12	5	.....	.....	.....	1–7
Maplewood	18	6	13	3	1	1	.....	.....
Sumner	12	12	7	2	1	.....	2	1–6
Morris	25	10	19	5	1	.....	.....	.....
Oak Street	27	5	20	4	1	2	.....	.....
Jefferson	29	10	20	2	6	1	.....	.....
Third Avenue, Second Group	13	25	8	1	2	.....	2	.....

Third-grade Record.

SAMPLE LIST OF 25 WORDS.

chowder	banana	grade	dismiss	mutton
oyster	sneeze	improvement	basket	always
February	improve	syrup	once	thieves
preparation	biscuit	veal	chimneys	prepare
pickle	soup	buffaloes	dismissal	

SAMPLE LIST OF 10 WORDS.

easy	always	smooth	against	toward
touch	sword	shelf	bridge	guess

TABLE XX.

Third-grade Spelling.

NAME OF SCHOOL.	Number of pupils in grade.	Number of words in list.	Papers—number correct.	Papers with one word misspelled.	Papers with two words misspelled.	Papers with three words misspelled.	Papers with four words misspelled.	Papers with more than four words misspelled.
Third Avenue	22	25	8	6	2	2	1	1–5 1–8 1–14
Franklin	27	10	14	1	5	4	3	.....
Maplewood	21	25	11	5	2	.....	.....	3–5
Sumner	18	12	12	2	2	.....	1	1–5
Morris	22	10	15	4	.....	1	1	1–6
Oak Street	28	6	20	6	2	.....	.....	.....
Jefferson	20	10	6	6	6	.....	1	1–8

These data are given for whatever value they may have. One may not base conclusions concerning the spelling in the Leavenworth schools upon this one test; the lists of words differed greatly in number (varying from 25 to 5 words daily) and the words were different in each list. The classes having 20 and 25 new words seem to compare favorably with the classes having only 5 or 6. These data, therefore, are inserted chiefly because they came in response to the request for the written results of *one day's regular spelling lesson* in the second and third grades, and because they may be suggestive to the teachers in Leavenworth to question the significance of such varying demands and results in a school system of the size of Leavenworth.

NUMBER WORK.

Number work is the fourth "major" subject.

The following is a description of a number lesson which the writer observed in a first grade in which the children were exceedingly alert and accurate and the teacher full of interesting devices. The lesson was described by the teacher herself upon the observation blank provided by the Survey Staff, and is inserted below in the teacher's own words, but the description fails to give an idea of the spirit which animated the entire class.

Number Lesson—First-grade Class.

DEVELOPMENT OF 8 AND COMBINATIONS.

First, review work, previously given on 7's. Children have 7 objects. Child puts 1 more with them and sees 8.

Use a number of different objects, to show the same combination, that 7 and 1 are 8.

Have children give little number stories about these objects, after which teacher gives the figure 8.

Children trace it in the air as teacher makes it on board. Then class makes it on board and slates.

Each child has 8 objects. Begins with 1; sees that 7 more complete the 8.

Then we gain the following: $7 + 1 = 8$.

Then look at objects again; take away 7, the 1 remains. Take away 1, 7 remain.

Begin with 8 objects, and see that 5 more make 8. Take away 5 and 3 remain; take away 3 and 5 are left. $3 + 5 = 8$; $8 - 3 = 5$; $5 + 3 = 8$; $8 - 5 = 3$.

I play store with them, and they buy. (I have several objects to sell.) They have 8 cents to begin with. They must tell how much will be left after buying from me.

I also use children to illustrate the combinations of 8 and the taking away of different numbers.

I also use a string of 8 apples.

It was effective, for the faces were alive with interest and enthusiasm, and they knew the work next day and could give me the combinations belonging to the 8 family. I use objects and pictures all the time.

Judging from the work which I observed, there is no doubt that the *number work outlined for the primary grades* is most thoroughly and excellently done. The children work accurately and rapidly and enjoy the activity as thoroughly as they would an interesting game. The question is whether they are not too well drilled for the present use they can make of the number element in their actual living; whether the time given for so much drill for rapidity in addition and subtraction could not be better spent at this stage of development upon nature study and literature, allowing the children to see and to do things requiring the use of

several senses. If more of the work in measuring with various standard units of measurement, under the stimulus of some motive or purpose which the children could appreciate and from which they would gain experience in many directions, could be placed in the first grade, and more of the rapid abstract work placed in the third, it would seem a better arrangement and more adapted to the children's present needs. The writer believes that the children in the primary grades should have plenty of work in applied number, as it is needed in games, in nature study, in manual training and in science experiments, and that the units of measure thus used should be well fixed through use, but that most of the drill for rapid and accurate calculation should come *beyond the second grade.* This is not because the work can not be done in the two earlier grades (for as a matter of fact it is being well done in at least four schools which were observed), but because other more useful and necessary things are crowded out of this period of the child's life by so much number drill; and also because, when so much is done in the first and second grades, there is but little left to do in new mathematical processes and in the fundamental operations between the third and fifth grades; and still further, because much of the time so used is wasted, since in order to keep fresh what they learn until they have use for it the drill must be kept up, going over and over again the same facts and combinations until, from very weariness and lack of interest, the work is poorly done. Therefore, the Survey Staff urge that the drill upon the number process and work for rapid calculation be placed somewhat later in the course, when the child can feel the need or purpose for such work as he does in the third, fourth and fifth grades. This advice may have more weight, since it has been found in Leavenworth, as in other places, that pupils in the upper grades have not been made more efficient or accurate in mathematics from any point of view by the great emphasis placed upon the subject in the early grades.

COMMENTS UPON THE TELLING OF STORIES, WHICH IS A "MINOR" SUBJECT OF STUDYING IN THE LEAVENWORTH PRIMARY GRADES.

In three schools in which story-telling was observed, the writer has only commendation, for both the choice of stories used and the manner of telling them by the teachers. In another school, however, the children had apparently memorized the exact words of the stories they were telling, and therefore the work was lacking in spontaneity, and at least one of the chief values in story-telling was lost, in that the children were not imaging and expressing their own conceptions while telling the tales.

COMMENTS UPON THE DRAMATIZATION OF STORIES, SCHEDULED AS A "MINOR" IN THE LEAVENWORTH PRIMARY GRADES.

The writer saw the children acting out stories in three schools. In one it was merely the perfunctory going over of set movements, which had been repeated so many times that no thought was aroused. This was in a second grade, where the teacher said to the writer, "Perhaps you would like to see the children dramatize something," and out of a clear blue sky she called upon the children to act out "Jack and Jill." The children were willing, and it is true that "Jack fell down," but he kept

his "crown" carefully uplifted in the air so that it could not possibly have been "broken." He got up smiling, put back the pail, and ran back with Jill to his seat. No comment was made or expected. He probably had done the same thing in the same way a great many times.

In another room (third grade) the children played being "The little kind girl" and "The little cross girl." It was done in a self-conscious and stilted way, using the books for guidance in giving the exact words of the story, though the ideas could have been assimilated in one reading of the text. The choice of material here was not good, for though the story was dramatic in form, the literature was not of sufficient value to be worthy of the children's time, nor did the character of the self-righteous little good girl warrant the deep impression which acting gives.

On the other hand, in the other two schools there were glimpses of dramatic action which indicated real insight into and appreciation of the function of dramatic expression in education and a most careful discrimination in the choice of material. In the third grade of the Oak Street School the children acted out their own naïve interpretation of "Philemon and Baucis," and in the first grade of the Morris School the children delighted in the story of "Æolus and the Winds," and their expression was charming, spontaneous and original.

One found teachers in Leavenworth well aware of the dangers involved in giving school plays and dramatic presentations: such as, the overstimulation of children; the fostering of a tendency towards artificiality; the cultivation of insincerity; and, by overelaboration, the systematic blighting of the imagination, which may come to children if dramatization is thoughtlessly used. And these teachers also recognize the great value of dramatic presentation in education when it is rightly understood and directed.

Among the many possible values of the school play, a few might be named: such as, the establishing of moral ideals; the cultivation of initiative; the demand for the subordination of self to the group; the overcoming of self-consciousness; the training in good speech; the giving of bodily control and freedom in expression; and the appreciation of literary beauty. There is at least one teacher in the Leavenworth primary grades who is able to help the other teachers to gain the right point of view in dramatization, and the writer suggests that in the weekly teachers' meetings those in the system who are especially gifted or well trained in any one subject be asked to help those who are less able or less experienced, but who are attempting to do the same kind of work.

PHYSICAL TRAINING, SCHEDULED AS "SUPERVISED WORK" IN THE COURSE OF STUDY.

The physical training in the Leavenworth schools ranges in quality from the perfunctory carrying out of directions given by the supervisor to the freer interpretation of these directions in a few schools by the teachers who instinctively understand the needs of children and who work from principle in their attempts to get the best results from the physical exercise. The same conscientiousness was observed here as in the other work. Each lesson for the entire year is carefully outlined by the super-

visor and given to the class teacher in typewritten form, and she is expected to carry out these directions at least in spirit. Each lesson includes drill in correct standing position; facing; marching; arm, leg and trunk exercises; ending in each case with a game. The lesson is never twice alike, and plans for progression are provided for within the grade as well as from a lower to a higher grade.

If all the teachers were required to hold rigidly to these outlines the work might easily become perfunctory and mechanical, but this excuse for poor work does not exist. However, there seems to be little or no demand from the physical-training department for fresh-air activities, or for corrective gymnastics adapted to the needs of particular children. It is to be hoped that in the near future gymnasiums and swimming pools will be made accessible, so that all the children may use them, and it is urged that every school be provided with a well-equipped playground. At present the schools with the poorest provision of space outdoors seem to make the very best use of what they have, showing that they deserve better conditions. It seems to the writer that the great benefits of outdoor play, under right conditions and supervision, have not yet been recognized adequately in the community. It is well known that the playground, rightly used, is quite as strong ethically as physically in making for good citizenship.

CONSTRUCTION WORK OR ELEMENTARY MANUAL TRAINING.

In order to make clear what the writer considers to be a fundamental principle, two observations are cited. The writer asked to see the manual-training work in one of the schools. It was a week in which it had been planned to make kites—a very fitting plaything for the season—but the wood had not come, and the teacher, with mistaken zeal, called upon the other teachers and sat up all night preparing small cardboard frames, with dots about an inch and a half apart (which any second-grade child could easily have made) over which thirty-five children in the third grade were to make string bags. In the construction hour the children's work consisted in tying knots over each dot. There was little opportunity for serious effort on the part of an intelligent child of that age, since a mistake was scarcely possible, and the writer would have much preferred seeing this class make original working drawings for their kites, working from the teacher's dictation; or it would have been more valuable if the teacher had discussed with the children the simplest scientific principles involved in kite making. She could have given them information which they might have tested out by their experiments in the flying of kites; or she might have allowed them to draw original plans to a scale, and they could have made the kites at home from newspapers and waste pieces of wood.

On the same day, in a first-grade room of thirty children, each child was given strips and paste and provided with cardboard, all beautifully cut out by the teacher, to be used in making a play wren house. The children then followed dictation, folding the house on the carefully drawn lines, cutting out the circular door, pasting the ends of the house together, and putting on the roof. It took about twenty minutes of each child's time to finish thirty useless little bird houses, which looked very well, but

the teacher must have spent several hours in preparing the work. She also had done the thinking and planning. Again, in the writer's opinion, it would have been more educative work had several models of wren houses been placed before the children, if they had been given pencil and paste, and if each child had been asked to work out his own model of a wren house. The results would have been exceedingly crude, but the next day the teacher could have written directions on the blackboard which the children could have followed and which would have resulted in better houses. It is probable that even then there might not have been more than three or four really good models, but every child should have been exercising skill and judgment to the limit of his ability, which was not the case when each child contentedly and successfully followed the directions which were so simple that only a small degree of mechanical dexterity was necessary.

In both of these cases the teacher directing the work showed energy and good teaching ability, and accomplished the results which she planned for in excellent spirit, but since a burden of useless work rested upon the teachers, and since the Survey indicates that this fault in the manual-training work extends beyond the primary grades (and particularly since this seems to be a very common mistake in the handwork in schools all over the country), it seems wise to emphasize the futility of such exercises in a child's education. It will be perfectly obvious, upon reflection, to these and other good teachers doing this kind of work, that the educational value will be much greater to the children when the energy and industry which now goes into getting such quantities of quickly achieved but useless results is turned into getting self-actuated effort and activity into the *children's work*, and when the objects which are made are useful, however crude they may be.

The Survey Staff believe in urging that attention be given to this criticism; that it is in line with recognized expert opinion concerning manual-training work. It is in harmony with the ideas of Mr. Edward Worst, of the Chicago public school system, and Mr. Arthur W. Richards, of the Ethical Culture School in New York City, and with those of many other well-known directors of work in different parts of the country. The trend of education is placing the demand for activity and effort upon the child, and holding the teacher responsible for providing conditions which shall arouse in him motives and purposes that develop power and initiative. Social motives insure prolonged, sincere and cheerful effort, and result in satisfactory achievement.

COMMENTS UPON THE APPLIED ARTS DRAWING COURSE, SCHEDULED AS "SUPERVISED WORK" IN THE PRIMARY GRADES.

The report upon the applied arts drawing course appears as a whole in another part of this Survey, but the writer wishes to express appreciation of the spirit of the work in the primary grades. If at present the technique is somewhat overemphasized, and the time given to freer expression in connection with nature, literature and handwork is thereby curtailed, it is only a temporary phase of the work. The facts that the supervisor of this department and the teachers doing the work are open-minded and enthusiastic, desiring to be students of children as well as

of subject matter, and the fact that already (though the work is only two years old) some of the dangers of unrelated, isolated drill and of using a set series of books as a guide have been recognized, make one sure that this department will more and more use painting and drawing for their true purpose in the expression of thought. Drill will be used in helping children to overcome obstacles in technique which have arisen in their own work. All the problems that the child needs to solve, involving color and form, will arise naturally if he continually paints and draws in his science, history, nature study and literature, illustrating and making clear his imagery in the subject he is studying. There should, of course, be sequence in the work, but this should be determined from the standpoint of the child and not from that of the subject matter; and however good the textbook on art may be, it should be only the assistant to the teacher—the source of reference and advice. It should follow, not lead, and since this principle seems to have been grasped by the department, growth in art expression and appreciation are certain to come to the children in the Leavenworth schools.

CHAPTER X.

ARITHMETIC.

Walter S. Monroe.

THE COURSE OF STUDY.

SYSTEMATIC instruction in arithmetic extends throughout the eight grades of the elementary school.

In the fourth grade Smith's Primary Arithmetic is completed, pages 165-308. By the end of this year the pupil is expected: (1) to have mastered the four fundamental operations for integers; (2) to be able to use the four fundamentals in easy common fractions and easy decimals; (3) to apply the above, as fast as acquired, to—

Extension in one direction: inch, foot, yard, decimeter and meter;
Extension in two directions: square inch, square foot, square yard, square decimeter and square meter;
Extension in three directions: cubic inch, cubic decimeter;
Weight: grain, ounce, pound, gram;
Dry capacity: quart, peck;
Liquid capacity: pint, quart, gallon.

In grades five to eight the course of study is based upon Smith's Topical Advanced Arithmetic. The text is supplemented by problems and material furnished by both the pupils and the teacher.

POINTS OF EXCELLENCE IN THE TEACHING OF ARITHMETIC.

Although the results of the test which was given do not consistently indicate it, the writer believes the work in arithmetic is being placed upon a better basis. Some topics of arithmetic are now being taught so that the pupils understand the practical situations which produce the problems, and hence better understand the problems. This is well illustrated by the description of the first lesson on trade discount, which was given by a teacher in response to the "questionnaire to ascertain the methods of teaching":

"After teaching the simple cases of percentage, based on multiplication and division, our next subject was *trade discount*. I asked the pupils if they had ever noticed advertised sales of goods in the newspapers. Of course all had. I asked them to tell me about some of them. Every one could tell me about something that had been advertised at less than the marked price; some told of articles their mother had bought for them at sales, even telling what per cent off they got the goods for. We had a very interesting lesson telling *why* and *when* merchants sell goods for less than the marked price. They told me that goods were often sold at less than the marked price when the season for such goods was over; that some goods that were out of style were sold for less than the original price; that sometimes a man was going out of business, or was forced to sell out, etc. We got into such an interesting talk that it was hard to close the lesson. I closed this lesson by asking all to cut from a paper some advertised goods at discount. The next day we had more problems than we had time to solve. I sent each to the board

to figure up the discount on his goods advertised, and to find the price paid. Each had his own separate work to do and all were very busy about it."

In the beginning of the consideration of this topic the attention of the pupils was centered upon conditions in actual life which demand trade discount. As a result the pupils approached the problems with an understanding of them and their points of contact with the world of affairs. To these pupils the problems of trade discount were practical because of the way in which they had been approached.

On the other hand, in the following description of teaching liquid measure no reference is made to the connection of the subject matter considered with activities outside of school:

"Liquid measure was taught by beginning with the pint measure and building up to the gallon. First, the children were directed to fill the pint measure with water, pouring the water from that into the quart measure. The pint measure was filled and again poured into the quart measure, teaching 2 pints = 1 quart. We then proceeded as before using the quart measure to fill the gallon measure, teaching 4 quarts = 1 gallon. This plan was continued until the relations between the several measures were found."

So far as this description shows, there was no effort to connect this work of the schoolroom with anything which goes on in the world of affairs. Unless the pupils of their own accord realized that the milkman measures his milk in pints and quarts, and the groceryman sells vinegar by the pint, quart and gallon, and that the groceryman and milkman often must know how many of one measure make one of a larger measure, the work can not have been practical for the pupils. To them the work with the actual measures was abstract; that is, abstracted—taken away from even an imagined situation which would call for a knowledge of the table of liquid measure.

It might be pointed out that unless the pupil does understand the practical situation back of the problem he can not possibly know what arithmetical operation to perform upon the quantities which he is given. He must do what he is told to do either by the teacher or by the book. In the lesson on liquid measure the teacher told the pupils what to do at each step, and this was necessary, for otherwise the pupils could not possibly have known what to do. The "practical" problems in a text do or do not become practical to the pupils according as the pupils do or do not understand the practical situation which occasions the particular "practical" problem and connect the problem with that situation.

ORAL ARITHMETIC.

Some very spirited oral work was observed. A problem was given to the entire class. As soon as a pupil had solved it he rose, and when most of the class had so indicated their readiness to give the solution a pupil was called on. Another teacher conducted an oral drill upon the number facts of addition and subtraction by having the combinations written on the board and pointing to the combinations to be given.

Until the beginning of the administration of the present superintendent the work in arithmetic was largely oral and a stereotyped form

of oral analysis was insisted upon. Traces of this extreme emphasis upon oral arithmetic are still evident. The writer was told that pupils asked if they might solve the examples of Courtis Test No. 7 mentally, and, judging from the papers, some pupils did so.

CLASSROOM TECHNIQUE.

There is considerable work at the blackboard. The writer commends this practice and urges that there be even more in the upper grades. In the handling of work at the board greater efficiency would be obtained by improved classroom technique. For instance, a class was observed which was being drilled upon addition. One example was dictated; this was solved, and then another dictated, and so on. Some pupils finished and were compelled to wait until others finished. A few did not finish. Now much time could be saved if three or four examples were dictated at a time, and the work were stopped as soon as a pupil had finished all the examples. Even the slower pupils would then have some completed work. A record of the number of examples solved and the number correct would represent each pupil's score for the day.

One wasteful method was observed. Pupils were solving purely drill exercises on their slates. After all had finished, a group were selected to place their work on the board. The work was then explained in detail. In fact, it seemed that there was too much explaining of purely abstract work. Much of our understanding of things grows out of their use or manipulation. For the fundamental operations of arithmetic, drill is required upon the operations rather than upon repeated explanations of them.

Much of the work on practical problems was desultory. This was probably due in part to the assigning of the same problems to all or a group of students.

In the case of practical problems, when the purpose is study rather than drill, the work can be improved by making each pupil responsible for a group of problems either in the text or from lists supplied by the teacher. When a pupil has finished one problem let him immediately proceed to another, but save his work until the teacher can look it over. This plan will give each pupil something to do every minute of the class period. A few teachers in Leavenworth are now following approximately this plan. The teacher may spend her time, as some teachers were observed to do, in passing from pupil to pupil giving assistance to an individual or a group when it is wise to do so. In this way the teacher's help is given in response to a specific difficulty which the pupil has met.

MOTIVE.

It has been stated that "such statistical information as we have shows that arithmetic has always been looked upon by children as one of the most interesting subjects in the course."*

* D. E. Smith. The Teaching of Arithmetic.

TABLE XXI.

Tabulation of the replies to the question, "What school subject do you like best?"

Subject.	Grade 6.	Grade 7.	Grade 8.
Arithmetic	67	78	70
Drawing	1	..	..
Geography	59	40	4
Grammar	19	27	20
History	1	10	30
Manual training	1	3	0
Music	5	2	1
Reading	38	41	24
Spelling	9	6	1
Physiology	..	1	1

The question, "What school subject do you like best?" was asked of the pupils in grades six, seven and eight. Table XXI shows arithmetic to be the most popular subject in Leavenworth in these grades. This immediate interest in arithmetic furnishes a partial motive for its study. An additional motive is secured by causing the pupils to understand the relation of the problems to the practical situations which produce them, as was done in the teaching of trade discount. The pupils then see the use of the problem.

Another teacher was found who in teaching insurance was spending two or three days in studying the insurance business and insurance companies. The pupils and teacher were contributing to a common fund of knowledge about the practical situation which occasioned the arithmetical problems of insurance.

Some attempts to motivate, however, were not so successful. Much of the success in securing motive must result from the assignment. The lack of good assignments no doubt contributes to the passivity and desultoriness of some of the work observed.

Classroom technique is also a factor in securing motive. This is particularly true in the case of drill upon the operations of addition, subtraction, mutiplication and division. A plan of procedure which insures rapid and continued work will create enthusiasm. Such a plan has already been mentioned under the head of classroom technique.

ARITHMETICAL ABILITIES.

The Courtis Standard Test No. 7 was given to the pupils in the fourth, fifth, sixth, seventh and eighth grades in all of the buildings except Wilson and Cleveland. These two schools present essentially rural conditions, and the number of pupils in these grades was so small that it was decided not to give the test.

The test was given by the building principals of the three large elementary schools, Oak Street, Third Avenue, and Morris. The directions supplied by Mr. Courtis were followed carefully. A copy of the test was supplied to each pupil and twelve minutes were allowed for the work. The papers were scored by the teachers and were checked by the writer and a clerk working under his supervision. All calculations were made in accordance with the directions.

TABLE XXII.

Courtis Standard Test No. 7.—Class Averages.

ATTEMPTS.

SCHOOLS.	Grades.								
	4	5B	5A	6B	6A	7B	7A	8B	8A
Standard score	*7.0*		*9.0*		*11.0*		*12.5*		*14.0*
Third Avenue	6.5	6.3	8.2		8.8	7.7	6.8	9.2	8.2
Morris	4.6		5.4	8.6	8.0	8.6	9.8	10.8	12.2
Oak Street	5.8		6.7		8.2	7.7	9.7	10.4	9.5
Maplewood	7.7	6.6	5.9	7.5	8.0				
Sumner	6.8		8.7		9.3		9.4		9.8
Lincoln	3.6		5.4		8.2		10.4		9.1
Franklin	5.5		9.1		9.1				
Jefferson	7.0								

TABLE XXIII.

Courtis Standard Test No. 7.—Class Averages.

RIGHTS.

SCHOOLS.	Grades.								
	4	5B	5A	6B	6A	7B	7A	8B	8A
Standard score	*3.5*		*5.2*		*6.7*		*8.2*		*9.4*
Third Avenue	1.5	4.9	6.5	4.7		4.4	3.9	5.6	5.7
Morris	2.2		3.1	4.2	4.0	5.8	6.6	8.0	8.3
Oak Street	1.7		3.4		5.2	4.7	5.2	7.0	6.5
Maplewood	1.3	0.7	2.2	3.8	4.4				
Sumner	2.6		4.4		5.2		6.4		6.3
Lincoln	0.9		2.6		6.1		7.2		4.9
Franklin	3.7		4.5		4.7				
Jefferson	4.3								

The classes were sufficiently large for the average scores to be reliable in most cases. In considering Table XXII we find that the fourth grade of the Maplewood School exceeds the standard average number of examples attempted, and the fourth grade of the Jefferson School just equaled the standard average. The fifth grade in the Franklin School exceeds the standard. But in no other case is the standard average equaled or exceeded. Thus out of 42 classes only three equaled or exceeded the standard average for the number of examples attempted. The average for most of the classes fall conspicuously below the standard; for example, the third and fourth grades in the Lincoln School, the seventh and eighth grades in the Sumner School, and practically all of

the classes in the three larger schools, Third Avenue, Oak Street, and Morris. It is interesting to note that the three cases of equaling or exceeding the standard average of examples attempted occur in the smaller schools.

In Table XXIII we find that again three classes equal or exceed the standard average for the number of examples worked correctly, but in only one case do we have the same class, viz., the fourth grade in the Jefferson School. The fourth grade in the Franklin School and the fifth A grade of the Third Avenue School are the other two cases. The fourth grade of the Maplewood School is one of the three lowest in number right, although it stood highest in the number of examples attempted.

TABLE XXIV.

Per Cent of Examples Right (Based upon Class Averages).

SCHOOLS.	Grades.							
	4	5B	5A	6B	6A	7B	7A	8B	8A
Standard score	*50*	*58*		*61*		*66*		*67*	
Third Avenue	23	78	79	53		57	57	61	69
Morris	48	57		49	50	67	67	74	68
Oak Street	29	50		63		61	53	67	68
Maplewood	17	11	37	50	55	.....		.....	
Sumner	38	50		56		68		64	
Lincoln	25	48		74		69		54	
Franklin	67	50		52		.....		.....	
Jefferson	61	.....		.....		.....		.....	

It may be thought that the low class averages may be due to the pupils working slowly but with unusual accuracy. In Table XXIV we give the per cent of examples right as determined from the above class average. This table shows that in a very few cases the per cent of examples worked correctly is materially above the standard per cent right. For instance, the classes in the Maplewood School are below the standard for both number and the per cent of examples worked correctly. In the fundamental operations of arithmetic, with the exception of the fourth grade, the pupils of the Maplewood School work more slowly and make relatively more mistakes than the standard classes.

On the other hand, both fifth-grade classes of the Third Avenue School work more slowly but with more accuracy than the standard fifth-grade class. In fact, the fifth A class is so accurate that the average number of examples worked correctly is conspicuously above the standard. The fourth grade of the Jefferson School has the distinction of being above standard from every point of view.

The observations of the writer tend to confirm the results of the tests. The inaccuracy of pupils was conspicuous in a number of classes, and

teachers commented upon the fact. The necessity of drill is emphasized by the superintendent in the course of study, but apparently it has been neglected for very little rapid drill work was seen.

RECOMMENDATIONS.

The results of the Courtis test show a need for written drill upon the fundamental operations with integers. This drill should secure increased speed and accuracy.

More attention should be given to the study of the practical situations which produce the "practical" problems. In doing this it would be well for a class to make a special study of some practical situations, such as banking, insurance, building or construction work, etc. But the teacher should avoid the monotony which will result if each succeeding class is ground through the same plan. The topics for special study should vary from class to class. Let each class have its own "hobby." After a practical situation has been studied, a wide range of the typical problems from that situation should be studied. If it is desirable to supplement the text in this respect, lists of problems may be collected by the teacher and pupils. It might be profitable to have such lists mimeographed and a copy placed in the hands of each pupil.

It is believed that the work would be improved by exercising more discrimination and evaluation in determining the subject matter which is to be taught. The elimination of some obsolete or obsolescent material has been accomplished. But it may be questioned whether such a topic as "special per cents to be memorized" deserves to be taught and drilled upon. Knowledge of these special per cents is useful only as a device which saves time when one has many problems to solve which involve these per cents. The devices will be acquired by the pupils if they are really useful.

The results of arithmetic teaching should be measured by the best instruments available. At present these are the Courtis Standard Tests. The building principals should assume the responsibility for this work as part of their work of supervision. The Courtis Standard Tests are also valuable for purposes of detailed diagnosis. The weaknesses of backward pupils may be determined and the appropriate remedy applied.

It is also not too much to expect that the principals and teachers attempt the scientific determinations of the best methods and devices of teaching arithmetic.

CHAPTER XI.

DRAWING IN THE ELEMENTARY SCHOOL.

Ella V. Dobbs.

THE COURSE OF STUDY.

DRAWING is taught in all grades of the elementary schools of Leavenworth and has been under the direction of a supervisor for two years. The Applied Arts Drawing Books form the basis of the course, which is planned with reference to the seasons of the year, and includes color work with brush and crayon, pencil sketches, and designs to be applied to handwork projects. The handwork includes paper cutting and folding, weaving and basketry, and construction in paper and cardboard.

The organization falls into three general types of work: First, appreciation of the beauty of line, form and color is sought through the making of sketches of landscapes, fruits, flowers, leaves, and through pose work, object drawing, and all forms of representative art. Second, the relation of art principles to common things is studied through the making and decorating of articles for school and home use, such as booklets, blotters, telephone pads, wastebaskets, table covers, etc. Third, acquaintance with and interest in good pictures is sought through a study of some of the world's great masterpieces, and in making collections of small prints.

A general outline for each grade is prepared for the year. This is supplemented by a specific outline given to the teachers month by month, in which definite projects are suggested and directions given for carrying them out. For example, the outline for the first month for the first grade makes the circle the basis of form study, and directs that the pupils be given circular pieces of cardboard as guides in drawing circles. After they draw around the cardboard, the circle is to be filled in with a colored crayon in imitation of a balloon, an apple, or some other circular object. The organization progresses month by month through the common geometrical figures, as square, triangle, etc., each being applied later to familiar objects.

These monthly outlines also suggest definite projects in construction which embody the art principles studied. One such outline for the upper grades included complete directions and dimensions for making a blotting pad, for which original border designs were to be drawn and applied by the pupils. These monthly outlines aim to provide ample work for classes that work rapidly, and provision is made for omissions by classes which must work slowly. They also tend to keep the work uniform throughout the city, and maintain a fair standard of excellence.

SPECIAL TEACHERS FOR DRAWING.

In each building arrangements are made for teachers who have special talent or training in art, to teach this subject in several rooms. The supervisor wisely allows ample freedom to all teachers who are able to work independently.

THE TEACHING OF DRAWING.

School art courses have been strongly influenced by the logical and traditional methods used in art schools where the study is directed toward picture making. The work in Leavenworth shows the effect of these traditional methods, but it also shows a strong tendency to break away from traditions which do not prove themselves well adapted to present needs. The present work compares well with average school art work, and that which is being done is being done well. Both teachers and supervisor seem keenly alive to the importance of the subject, and conditions are ripe for the forward step which will place Leavenworth among the leaders in this field.

Judged from the standpoint of execution alone, the work, as observed by the writer, rises to its highest point in nature sketches and object drawing. Systematic work on the part of the teacher and painstaking effort on the part of the pupil combine to produce results of remarkably uniform excellence in neatness and quality of work. Judged from the standpoint of practical value, the highest point is reached in the work in applied design. Some excellent work was observed by the writer in the Morris School, in which the pupils had designed borders for blotting pads from a leaf motif. Each pupil made his own design and had cut a stencil to aid in its application to the blotter. After the pupils had made some unsuccessful attempts to mix appropriate colors, a specific lesson on color combinations was given. Two color schemes were agreed upon as suitable to the paper from which the blotters were made. The class was divided into two groups. Methods were discussed and definite instructions given for obtaining the desired tones in each color scheme. The entire class gave attention to the instruction in both schemes, and contrasts between the two were noted. Following the theoretical instruction each pupil worked individually upon one of the two schemes discussed. The results promised to be very satisfactory.

Work of this type is to be commended in that it provides a strong motive and scope for initiative through the individual interest of each pupil in reaching a high standard of execution in making something which he values. Answers to the question, "What that you have made have you enjoyed most?" called forth a strong vote for blotter pads. This lesson is to be commended also in that it gave definite help to the children after they had tried to work alone and had discovered their own needs. While sound pedagogy demands that children shall not be told what they can readily discover for themselves, it does not require that they shall be left to rediscover, unaided, all the short cuts known to modern science.

Work of this type, if continued throughout the grades for a period of years, would tend to develop initiative and resourcefulness and would make possible a greater amount of individuality than that described. For example, in classes accustomed to individual effort, a choice in motif as well as design could be encouraged, together with a greater variety in color schemes.

SCHOOLROOM DECORATIONS.

Interest in the field of picture study is evidenced in an unusually large number of well-chosen copies of good pictures which are to be found on the walls of the Leavenworth schools. In some instances the effect of really fine, large pictures is lowered by an excess of small pictures filling up the background, or by an overdecoration of the blackboard. The blackboard in a schoolroom is designed primarily for the practice work of pupils. Any decoration which takes up needed space is ill advised. And further, blackboard crayons are apt to be strong and crude in color. The decorations made from them are not apt to be of a high grade of art, or calculated to aid in developing a high order of appreciation in the pupils. Those made from prepared stencils are apt to be marked by fanciness rather than beauty.

BOOKS FOR REFERENCE.

It is suggested that instead of using any one drawing book all drawing work be done on separate paper and that each room be supplied with several good drawing books of suitable grade, and other reference material. This reference material should include at least a good periodical for each building (such as the *School Arts Magazine*). Pupils should be encouraged to bring in additional helps as needed. Instead of following a drawing-book course, the subject matter should grow out of the immediate interests of the school and the home, that the children may feel that beauty is an essential element in daily life—not that art is a desirable but superfluous decoration of things.

APPLICATIONS.

Daily lesson papers in all school subjects should receive the same care in matters of spacing and neatness that is given to a sketch in the drawing lesson. Letter-writing calls for the exercise of taste and the application of art principles in the choice of paper, the width of margin, and the arrangement of the page. Art principles apply to the making of book covers and illustrations for composition work, to poster illustrations for geography and history, to the case and repair of schoolbooks, and to taste and comfort in classroom conveniences, such as blotters, pencil boxes, and book bags. Too frequently the beautiful things of this type which are made by the pupils are put away in a drawer to be saved for the annual exhibit, while daily needs are supplied by any sort of accessories which the child may happen to possess. The supervisor's influence may be legitimately extended to include these fields which our present common practice tends to separate from the realm of art in the minds of the children.

The art course may profitably include, also, definite study of costume designing and house furnishing, which may be begun in the lower grades in the dressing of dolls and the building of playhouses and lead up to the making in the upper grades of things to be actually worn and used in the home.

Through these and similar projects the art work should take on a very practical turn, and mere drawing occupy a very subordinate place.

School art should seek to make every child familiar with the distinctions between good and bad in these common things. It should be the esthetic element, the note of beauty which enters into and crowns every activity of the day. It should make pupils live more beautifully. Whatever needs to be done should be done in the most beautiful way possible. The study of what constitutes the *most beautiful way* and how to secure the desired result would suggest the topic for the drawing period. The supervisor would then need to spend very little time on preparing the details of a course of study, but a great deal of time studying *what things needed to be done,* and would act as a general adviser in finding the best and most beautiful way to do them.

The trend of modern school art is toward greater emphasis on this practical application, but it can not be accomplished with any degree of success unless art study is bound up, literally entangled in, the things which mean most to the children. The making of kites, the dressing of dolls and the building of a playhouse offer a better point of attack than a logical arrangement of geometric figures or a formal study of primary and secondary colors. The logical organization of these technical principles belongs in the upper grades after a sufficient accumulation of first-hand experience to make them intelligible.

CHAPTER XII.

GEOGRAPHY.

Walter S. Monroe.

THE COURSE OF STUDY.

GEOGRAPHY is taught in the fourth, fifth, sixth and seventh grades. The state texts, King's Primary Geography and Tarr and McMurry's Advanced Book, are used. In addition, a varying amount of supplementary material is used.

The writer was told by some of the teachers in a general meeting that some home geography was taught in the grades below the fourth, but it is not mentioned in the course of study nor is it given in the teachers' own reports on the disposition of their time. Hence it must be of a very incidental type and not significant as to quantity.

The order of the course of study follows that of the texts, except that Part IV of Tarr and McMurry's Advanced Book is made to follow Part V. The aim and scope of the work of the fourth grade is described in the printed course of study as follows:

AIM 1. *To teach the child to observe by observing.*
2. *To teach the child to read maps and pictures.*

1. Geography looked at from the teacher's point of view may be divided into the following kinds:

(*a*) *Observational Geography*, relating to land forms, water forms, atmospheric forms, life forms.

(*b*) *Representative Geography*, relating to maps, graphs, and pictures.

(*c*) *Rational Geography*, relating to movements of the earth and results, movements of water and results, movements of life and results.

2. Geography in the fourth grade should, of course, be largely (*a*) and (*b*). (*a*) should be taught almost entirely outdoors, with constant reviews in class work indoors.

King's Primary Geography is the basis for the work of this grade. Part 1, 10 pages, is called "Home Geography by Observation," but it presents a very inadequate treatment of the topic. Following this we find the usual order of topics—"The Earth as a Whole," "North America," etc. There is nothing in the printed course of study to show that this order is not followed in the teaching of geography.

An unusual number of geographical readers and other reference books were reported by many teachers. A number of such books were in evidence in a few classrooms and some were observed in use. On the other hand, a few teachers reported practically no books suitable for children to read.

ILLUSTRATIVE MATERIAL.

The illustrative material in evidence likewise varied. In some rooms a marvelous amount of material had been collected to illustrate topics. In other rooms there was practically no illustrative material except the usual maps. Much of this material was excellent, but some of it could

contribute but little to the work of the class if the supplementary books were used intelligently. For example, a number of charts had been made of pictures cut from old geography texts. These are very apt to be inferior to the pictures of the present text. The principal value which could come from such material would grow out of the actual work of collecting the pictures; hence it will be of little value to any class but the one which constructed it.

Much of the illustrative material has been planned and prepared by the teacher with little assistance from the pupils. The finished character of the material shows this to be true, and teachers said this was the case. By such action the pupils have been deprived of the opportunity for exhibiting initiative, for planning and doing something which has a tangible material form. Teachers in other schools have secured excellent results by keeping in the background and allowing the pupils to do the bulk of the planning and the work. It is true that they got a more crude product, but it is believed that the educational value to the pupils was much greater.

THE MODES OF TEACHING GEOGRAPHY.

1. *Question and answer.* In response to a question or request for specific information, it is given by the pupil called upon. Some of the teachers appear to use this mode of teaching almost exclusively, and a few have become rather expert in doing it.

2. *Semi-lecture.* The teacher does most of the talking, interspersing her talk with a few questions. Illustrative material is often used in this type of teaching.

3. *Extended recitations by pupils.* A pupil, when called upon, talks upon one or more phases of the general topic which has been assigned for the day. The pupil chooses the particular topic upon which he or she talks. One seventh-grade pupil was observed to talk for five minutes. The teacher talks very little; in fact, is quite completely in the background.

At times these talks are illustrated by pictures brought from home by the pupils. One teacher said, in describing a lesson on the Grand Canyon of Colorado: "The children were asked to bring pictures of rock, rivers, or scenes in Colorado near this river or of the canyon. The next day each child had either received information from other persons at home or had pictures of the canyon or surrounding places. As most of the pictures were on postal cards, or even smaller, the class was taken to another room and these pictures were shown to them by means of the reflectoscope. Each picture was explained by either a pupil or myself."

Each of these modes of teaching has its particular function in the process of teaching, and a number of characteristics of excellent teaching were observed in the use of these modes by the teachers; for example, the successful relegation of the teacher to the background in the case of "extended recitations by pupils," and the spirited and thorough testing of the pupils by questions and answers. The most animated work observed was furnished by a recitation of the latter type. But one gets the impression that the teachers were not discriminating in their use of these modes. A few appeared to be using one mode to almost a total exclusion of the others.

MOTIVE.

In the case of "extended recitations by pupils," one class was observed in which approximately half of the number were plainly inattentive. This was caused in part by the fact that all had been given the same general assignment, and thus the recitation of any pupil could not have a deep, vital interest to the other members of the class. Also, this condition probably was partly due to the monotony of this mode of teaching when used exclusively.

In some cases the attention of the pupils to the subject matter of geography is based upon real motives, but for the great majority of recitations the appeal is made to artificial incentives, though usually of the higher types. This motivation of the work in geography could be improved by (1) a more discriminating use of the modes of teaching; (2) more reports by pupils upon topics not assigned to other members of the class. In so far as possible these should be of the pupil's own choosing.

A class was observed in which a large per cent of the children were of foreign descent, and the teacher said one was foreign-born. The class was studying Europe, and the teacher could profitably make use of this condition. It is probable that the pupils of foreign descent possessed knowledge, or could obtain it in their homes, of certain of the countries of Europe, and would have a real motive for contributing this to the class. Certainly they would have a vital interest in reading about the home of their ancestors.

THE PUPILS' KNOWLEDGE OF GEOGRAPHY.

The pupils' knowledge of geography could be judged only on the basis of the classes observed. Some classes showed a *good* knowledge of geographical facts, other classes only a fair knowledge. In general, the best knowledge was exhibited by those classes which had been confined to mere factual subject matter, such as location and bounding of states. In some instances, where review questions were asked, a number of pupils made a poor showing. This suggests that in these cases the subject matter had been learned only for the time being and that there were not well-defined ideas back of the words. It seemed that adequate provision was made for drill if the subject matter was properly understood when it was gone over.

In conclusion it may be said that there are evident attempts to place the instruction in geography on the higher plane. However, much of the instruction is on the lower plane.

RECOMMENDATIONS.

The course of study will be improved by the exercise of more discrimination in the selection of the subject matter, and particularly in the relative emphasis. The writer believes that the bounding of states, rivers, lakes, capes, etc., has an important place in geography, but in the past this has often been almost the whole of the subject. In some of the classes visited the writer believes too much relative emphasis was being given to this type of subject matter, and too little emphasis to the

human aspects of the country, the occupations, the child-life, the industries, etc.

Perhaps some incidental study of local and state geography is made in the primary grades, but evidently it has not been given a place in the printed course of study and is not considered a subject by the teachers. It is recommended that more prominence be given to local and state geography in the early part of the course. Leavenworth is particularly rich in local geographical material, because of its geographical position and its varied industries and cosmopolitan population. In view of this, more than usual emphasis upon local geography might be justified.

Only a limited use appears to be made of type studies, and the work would be improved by more of such studies. Such studies possess several advantages. As a result of an intensive study the subject matter becomes more real to the pupils, thus increasing the interest in the work. Because of the intensive study, the subject matter is remembered better.

CHAPTER XIII.

HANDWRITING.

W. W. Charters.

THE TIME GIVEN TO HANDWRITING.

HANDWRITING is given as a major subject in the primary grades and is continued as a minor subject in the following grades. It is begun in the first week of school, and 5.8 per cent of the total time is given to it. If we may judge from the table given on page 59, this is ample time provision. There is no supervisor of handwriting.

THE QUALITY OF THE HANDWRITING.

Samples of the best handwriting on ruled paper with ink were collected from all pupils in grades 2 to 8, inclusive. The teachers who collected samples were instructed to say to the pupils: "You are to write your very best. Take all the time you need to show me how well you can write, for your specimens are to be collected and sent to the superintendent and compared with the handwriting of other schools. Write as I read."

The following sentences were then dictated:

> Then the carelessly dressed gentleman stepped lightly into Warren's carriage and held out a small card.
>
> John vanished behind the bushes and the carriage moved along down the driveway.

The samples graded were taken on or about March 4, 1914, and represent midyear form. The Thorndike scale was used in determining the quality.

TABLE XXV.

A condensed statement of the best handwriting in ink of the children in grades 2 to 8 of the Leavenworth Public Schools, March 1, 1914.

GRADE II.

SCHOOL.	No. of cases.	Quality.													Av.	A. D.	Var.
		4	5	6	7	8	9	10	11	12	13	14	15	16			
Cleveland	5				2		1	2									
Franklin	20		1	3	8	6	2								7.25	.75	10.3
Jefferson	36			1	20	11	4								7.50	.56	7.5
Maplewood	30				14	10	6								7.70	.75	9.4
Morris	23			1	12	7	2			1					7.65	.75	9.7
Sumner	34				9	17	5		3						8.15	.68	8.3
Third Ave.	19			2	10	5	2								7.57	.58	7.9
Wilson	6				5	1											
Total	173		1	7	80	57	22	2	3	1					7.67	.77	10.0

GRADE III.

School.	No. of cases.	Quality.													Av.	A. D.	Var.
		4	5	6	7	8	9	10	11	12	13	14	15	16			
Cleveland	3					1	1	1									
Franklin	14			2	2	4	5	1									
Jefferson	30				8	11	9		2						8.23	.77	9.4
Lincoln	13			2	10	1											
Maplewood	37			2	13	13	6	2	1						7.89	1.00	12.7
Morris	25				10	6	5	3	1						8.16	.96	11.8
Oak St	30			8	11	6	5								7.27	.80	11.0
Sumner	23				1	5	6	7	4						9.35	.86	10.3
Third Ave	21			1	6	6	6		1	1					8.24	1.00	12.1
Total	196			15	61	53	43	14	9	1					8.03	.98	12.2

GRADE IV.

School.	No. of cases.	Quality.													Av.	A. D.	Var.
		4	5	6	7	8	9	10	11	12	13	14	15	16			
Cleveland	3								3								
Franklin	12			1	3	4	1	2	1								
Jefferson	26					6	12	5	3						9.19	.55	7.1
Lincoln	21				3	6	9	1	2						8.67	.95	11.0
Maplewood	30				7	7	8	4	2	2					7.67	1.23	16.0
Morris	23			1	12	7	2			1					7.65	.74	9.7
Oak St	34		1		2	10	12	7	2						8.82	1.09	12.4
Sumner	28					3	7	5	8	2	2	1			10.32	1.25	12.1
Third Ave	23			1	3	5	10		3	1					8.78	1.22	13.8
Wilson	5					1	1	1	2								
Total	205		1	3	30	49	62	25	26	6	2	1			8.93	1.32	14.78

GRADE V.

School.	No. of cases.	Quality.													Av.	A. D.	Var.
		4	5	6	7	8	9	10	11	12	13	14	15	16			
Cleveland	4						1		1	1	1						
Franklin	11				3	3	2	2	1						8.55	10.9	11.6
Lincoln	13				1	5	4	1	1	1							
Maplewood	39		1		3	9	14	6	3	3					9.05	1.03	10.3
Morris	42				3	15	15	3	2	3	1				8.95	1.12	12.5
Oak St	37				6	10	14	4	3						8.68	1.00	12.4
Sumner	19					4	7	3	4	1					9.53	.95	9.9
Third Ave	54				4	10	14	10	12	2	1	1			9.57	1.24	13.6
Total	219		1		20	56	71	29	27	11	3	1			9.15	1.06	11.6

GRADE VI.

School.	No. of cases.	Quality.													Av.	A. D.	Var.
		4	5	6	7	8	9	10	11	12	13	14	15	16			
Franklin	16					1	6	4	3	1	1				10.00	1.00	10.0
Lincoln	11						5	1	4	1							
Maplewood	40					1	16	8	7	7		1			10.18	1.28	12.2
Morris	60					9	31	9	8	3					9.42	.72	7.6
Oak St	35				5	6	14	7	2	1					8.97	1.23	13.7
Sumner	14					1	4	2	7								
Third Ave	32				1	5	10	6	6	1	1		1	1	9.97	1.41	14.1
Total	208				6	23	86	37	37	14	2	1	1	1	9.69	1.03	10.6

GRADE VII.

School.	No. of cases.	Quality.													Av.	A. D.	Var.
		4	5	6	7	8	9	10	11	12	13	14	15	16			
Lincoln	11						5	1	4	1							
Morris	55					2	13	8	10	13	7	2			10.87	1.49	13.7
Oak St.	64					5	14	24	12	7	2				10.13	.88	8.7
Sumner	10							3	6	1							
Third Ave.	60					4	17	14	15	6	4				10.23	1.07	10.5
Total	200					11	49	50	47	28	13	2			10.40	1.11	10.7

GRADE VIII.

School.	No. of cases.	Quality.													Av.	A. D.	Var.
		4	5	6	7	8	9	10	11	12	13	14	15	16			
Lincoln	7							2	4		1				10.40	1.11	10.7
Oak St.	39					8	7	8	9	5	1	1			10.08	1.26	12.6
Morris	22					3	4	4	4	5	1	1			10.68	1.41	13.2
Sumner	5								2	1	1	1					
Third Ave.	75					1	20	22	24	7	1				10.25	1.84	18.9
Total	148					12	31	36	43	18	5	3			10.34	1.06	10.5

Table XXV is a condensed statement of the quality of the handwriting of the system of grades and buildings.

For instance, the first item in Table XXV reads thus: In the second grade in the Cleveland School five samples were collected. Two of these are graded 7, one is graded 9, and two are graded 10, on the Thorndike scale. The second item reads thus: In the second grade of the Franklin School 20 samples were collected. Of these one is graded 5, three 6, eight 7, six 8, and two 9. The average for this grade is 7.25, the average deviation .75, and the variability 10.3 per cent.

In computing the central tendencies and the variability the Courtis Manual is followed. Where there were less than 15 samples presented from one class the average is not calculated. The individual error in grading is about 3 per cent. For instance, the Franklin second-grade average is 7.25. But when the graders grade these a second time they will vary inside 3 per cent. They may be 1½ per cent above or 1½ per cent below. 1½ per cent of 7.25 is .11, so the average of the grade lies between 7.25 and .11 and 7.25, or between 7.36 and 7.14. This means that in estimating the Maplewood and Morris second grades, one of which is 7.70 and the other 7.65, they should be judged as approximately equal in quality because of the probability of individual error in grading.

Bearing this in mind, it will be noted that there is practically no change in quality between the seventh and eighth grades. It will be observed, also, that there are a few classes conspicuously above or below the average. The Sumner fourth grade is the most conspicuous deviation, since the children stand in quality almost at the seventh- and eighth-grade averages.

There is a noticeable variation between the best and poorest classes in

each grade. For instance, in the Sumner third grade the average is 9.35, while in the Maplewood third grade the average is only 7.89, and in the Sumner fourth grade the average is 10.32, while in the Morris School the average for the fourth grade is 7.65. Similar extremes will be found in each grade.

In selecting the kind of handwriting to judge, the simplest case was taken—that of best handwriting. No attention was paid to speed. The object was to discover how well the children had learned to form the letters.

TABLE XXVI.

A condensed statement of totals for the Leavenworth Schools by grades.

GRADE.	Average.	Average deviation.	Variability.	Number of samples.
II	7.67	.77	10.0%	173
III	8.03	.98	12.2%	191
IV	8 93	1.32	14.7%	205
V	9.15	1.06	11.6%	219
VI	9.69	1.03	10.6%	208
VII	10 40	1.11	10.7%	200
VIII	10.34	1.09	10.5%	148

TABLE XXVII.

A condensed statement of totals for five Missouri cities of about 10,000 population.

(These are midyear samples collected between February 1 and February 15, 1914.)

GRADE.	Average.	Average deviation.	Variability.	Number of samples.
II	7.70	1.3	16%	387
III	8.43	1.5	17%	333
IV	9.22	1.6	17%	468
V	9.44	1.3	14%	337
VI	9.82	1.3	13%	306
VII	10.62	1.3	12%	328
VIII	10.72	1.1	9%	197

Table XXVII was not prepared by the same graders as were Tables XXV and XXVI, and we do not know accurately how great individual error may arise because of this. But our opinion is that we are justified in saying that the handwriting of the Leavenworth school children is not conspicuously better nor conspicuously worse than that of the children in the Missouri systems studied.

It should be noted, again, however, that within the system the grading was done by the same individuals, and that, as said above, the individual error is not greater than 3 per cent.

RECOMMENDATIONS.

Only one recommendation is to be made. The supervisory force should investigate classes conspicuous for good or for poor writing to ascertain the cause of each. In all probability in the high-grade classes devices are used which should be made known to all the teachers in the system, and particularly to those which have conspicuously low class averages.

CHAPTER XIV.

HISTORY AND CIVICS.

Walter R. Smith.

THE COURSE OF STUDY.

THE study of history in the grades is begun with the reading of Gordy's Beginnings of American History in Europe in the seventh grade. The aim is to correlate it with literature and reading. In addition to the above, there is outlined for the last two months of the seventh grade: Geography, history and government of Kansas; books—Tarr and McMurry's Advanced Geography, Supplement on Kansas; Arnold's Civics and Citizenship, Local and State Government, pages 1-153. About fifty to ninety minutes per day for two months is divided between three studies of Kansas—geography, civics, and history—which, if divided equally, would mean about thirteen recitations on Kansas history based upon the above outline. In the eighth grade history and citizenship is made one of the four major studies. Foster's History of the United States and Arnold's Civics and Citizenship are used as texts.

Unfortunately the grade teacher in Kansas is bound down to a state text which she is expected to teach. This is not the fault of the Leavenworth teachers; it is their misfortune. The history is a fairly good compilation, but is not discriminating and inspiring. Facts and events are doled out with a measuring vessel rather than organized "around great central facts bearing directly on the destiny of our country," as demanded, rightfully, for seventh-grade work.

For this reason it is hard for the most earnest teacher to break away from the traditional equivalence of historical facts. It is greatly to be desired—in fact it is necessary—if history is to retain its importance in the curriculum, that it be brought up to date. Ancient, irrelevant and unimportant facts and events must be relegated to the junk pile along with antiquated machinery, curio museums, and ornamental offices and titles. The past must be linked to the present, and historical study must be made to center about present problems. If colonial history is important, the history of the present Mexican imbroglio or the initiative and referendum or the political advancement of woman is no less so, and history must establish its right to remain in the curriculum by proving its everyday connection with the life of the boy and the girl.

CLASSROOM WORK.

In regard to the actual teaching of history, it may be said that every history teacher in the grades showed earnestness, careful preparation, good control of the pupils, and a sufficient knowledge of the subject. Three of them were principals and the others showed virile personalities. All were trained and experienced teachers. Most of them were able to get results—the results aimed at. Any great improvement, therefore, must come from a revision in the point of view or aim of history teaching.

Most of the pupils were interested. They were getting the facts that would enable them to pass a good examination on the text. So far as knowing the traditional amount of history is concerned, they would not be found wanting. Not only that, but in addition they were getting good training along certain lines. Every teacher asked topical questions. Few of the categorical queries frequently propounded were heard. Pupils were required to talk to a subject, and many of them did it well.

Also, every teacher showed some resourcefulness in getting together supplementary materials. Maps, charts, pictures, etc., were plentiful. Many pupils showed they were doing supplementary reading, and they were allowed to use this material freely. Some teachers, however, did not seem to stimulate this sort of work as much as good teaching demands. Also, some teachers failed to show skill in using materials at hand. For instance, one teacher showed a series of illustrative pictures to a class of about fifteen pupils. They were well explained, and interesting things said about them, but they were held before the class in such a way that only about five of the fifteen could see them, and by the time they were well started down the line for inspection a new explanation was being given, and most of the pupils had lost both connection and interest. Commendable preparation was thus lost in poor teaching technique, and the lesson thereby rendered perfunctory. There was likewise in some cases a tendency to outline the subject to death. An outline is a logical contrivance that may have good or bad effects upon youthful students. It is especially valuable for review work; but too much mechanism not only destroys interest, it blights thinking. One teacher placed an elaborate outline of the text on the board, quite suggestive to a mature person, and required it to be copied. Next day the pupils used these outlines in their open notebooks before them, and were called upon to recite upon topic 1, topic 2, and so on. The result was inevitable. A study that ought to arouse interest and enthusiasm was dulled, and a bright, conscientious and hard-working teacher was burying her subject in mechanical routine. With the same ability, patience and effort directed toward a better end, live problems treated historically, this teacher would have a wide-awake class, getting an idea of the intense human interest bound up with past life, and forming habits of historical investigation that would later function repeatedly in citizenship.

LACK OF SOCIAL GROUP WORK.

One other point needs mention. Every teacher asked topical questions, and generally discriminating ones, but the pupils recited to the teacher. And in most cases it was an individual recitation. Few teachers showed enough effort to make the topic social; that is, to hold every pupil responsible for thinking of the topic under discussion. This individual recitation was doubtless made necessary by the large number of topics discussed. But that is the difficulty. The number ought to be reduced by eliminating the minor ones. The best result of history teaching lies in developing thinking ability, judgment. This can not be done by moving rapidly over a succession of topics. The subject discussed should be a class subject, with all pupils ready, and, if possible, anxious

to contribute. This calls for cross-questioning, too little of which was observable.

Cultivation of thinking habits and evaluative judgment depends upon concentrating all the force of the mind on a specific topic and holding it there as long as possible. Instead of doing this some teachers were observed to explain a pupil's difficulty as soon as it appeared, when the class might well have worked it out together, thus conserving attention and stimulating initiative.

Tested by the five points used by the Staff in judging the effects of teaching upon the pupils, it may be stated that three and five, *i. e.*, *organization* and *acquisition*, were quite up to or above standard. Training in *evaluation* was made difficult by following too definitely an undiscriminating text. *Initiative* was also stifled for that reason, but could be developed by emphasizing more fully current events studied critically—not recited incidentally—and a freer use of supplementary topical study and class discussions. Scientific effort at motivation was too generally lacking, and strong personal leadership was necessary to maintain interest in subject matter which too few of the pupils could connect with everyday living.

RECOMMENDATIONS.

1. The curriculum needs revision with the idea of eliminating useless materials and emphasizing dominating events. An interesting and important topic should be given plenty of time at the expense of omitting much material now taught.

2. The amount of colonial history taught should be reduced one-half at least, and the time thus gained be spent on the very recent past.

3. The textbook should be made merely a guide, and the teachers should work with the pupils in studying history rather than in having them recite history.

4. Current events should be studied as a part of history work, not recited incidentally. Present-day problems should be introduced on the most suggestive occasions, traced to their historical beginning, and studied at the psychological time, regardless of the historical period placed in the school program.

5. Whenever possible, a question should be made a class topic, and a pupil's recitation should be not only to the teacher but to the class as a social group.

6. The teachers should work out a better point of view by wider historical reading and study, rather than put more specific effort and mechanical preparation into their lessons.

CIVICS.

As before mentioned, the study of civics is begun during the last two months of the seventh year. The first one hundred and fifty pages of Miss Arnold's Civics and Citizenship are studied in connection with the geography and history of Kansas. This is a study of local and state government, and only one class was visited. This was a well-conducted class by a superb drillmaster, and from the standpoint approached was above criticism. There appeared to the writer, however, to be a little

overstressing of pure memory work, and too little evidence of class research and visitation to local institutions. The teacher was quite evidently instructing the class rather than leading it in civics study.

In the eighth grade the national government is taken up when the history class reaches the constitutional convention of 1787. The remaining part of Arnold's Civics and Citizenship is used as a text. The date of the Survey permitted the observation of only one class. This showed the same excellent drill on subjects sometimes too far removed from the interests of most of the pupils. Some of the old tendency to teach constitutional law rather than actual government appeared, although an effort to stimulate political reading was evident. The only suggestion the writer can offer is that a constant effort be made to build upon what the child is interested in and knows. This necessitates a concrete study of local civic affairs, a careful study of current events in relation to general governmental problems, and the placing of stress upon actual government rather than constitutional interpretation.

CHAPTER XV.

HOUSEHOLD ARTS.

Ella V. Dobbs.

THE COURSE OF STUDY.

BEGINNING with the fifth grade, handwork for girls in the Leavenworth Public Schools deals with problems in household arts. Eighty minutes per week are devoted to this subject.

In the fifth and sixth grades sewing is taught by the regular grade teacher under the direction of the supervisor of household arts. The first work consists in the making of conveniences for sewing, including needle-case, pincushion, and bag to hold work, on which the elementary stitches are learned. These stitches are applied later to articles of wearing apparel, each girl making a complete suit of underwear for herself. In fifth grades working alone, the practice may be applied to the dressing of dolls.

In the seventh and eighth grades the work is directly in charge of the special teachers, and the classes are held in the High School. In the seventh grade a cooking outfit consisting of apron, towels, holders, etc., is made. This is followed by a princess slip or simple dress. Some study and discussion of the textile materials and their values, cost and care accompanies the lessons in sewing. The making of individual garments and articles to be used later by the maker furnishes a motive usually strong enough to hold the interest of the worker. There is considerable scope for individuality in the choice of color, style and minor details of the problem.

In the eighth grade cooking is begun. The aim of the course is to give the students an insight into the broad underlying principles of housekeeping, and an acquaintance with the preparation and food value of some common food materials. The points to be emphasized include such practical problems as the making of fires, a study of the mechanism of the stove and the regulation of drafts, and the regulation of fuel gas. Much emphasis is placed upon sanitation. Order and cleanliness in such everyday problems as the washing of dishes and dish towels and the care of kitchen sink and garbage can receive daily attention.

Lessons in cookery offer exceptional opportunity for training in habits of promptness and system, since each lesson, with a few exceptions, is a complete unit. In the eighty minutes allowed to the lesson each pupil must receive instruction in the lesson for the day, select her materials, prepare and cook the dish assigned to her, wash her utensils and return them to their proper places, and leave the laboratory in perfect order for the next class. Some pupils, undoubtedly, receive their first suggestions of systematic housekeeping in the school laboratory.

The study of food materials and their values includes a study of the chemical changes caused by cooking and a comparison of the relative values of various ways of preparing common foods; as, for example,

hard- and soft-boiled and fried eggs. The purpose is to give each worker some definite principles upon which to work, that she may not guess at methods and happen upon success or failure, but work with intelligence and certainty. The time to be devoted to the subject in school is insufficient to give the practice necessary to develop skill in any department. All that can be expected of such a course is that it shall suggest right methods of procedure which may be practiced in the home, and in this the course, as given in Leavenworth, seems to be very successful. To what extent this practice is carried on in the home, the teacher can judge only by the general attitude of the pupil and by occasional reports from parents. If some satisfactory plan of coöperation between home and school could be worked out, it would, without doubt, greatly increase the efficiency of both factors. In various parts of the country this problem is receiving attention and helpful suggestions are coming from many quarters.

RECOMMENDATIONS.

The writer suggests, also, a closer correlation between the departments of drawing and domestic art. One of the most urgent needs of the present times is definite instruction in costume design. Girls need to be taught not only how to make their own clothes well, but also how to select tasteful and becoming styles. They need some better basis for selection than the whims and fads of fashion. If such instruction is to be of general benefit, it must be given in the upper grades of the elementary school, since so many pupils drop out before they reach the High School.

There is definite need of the same kind of instruction in the application of art to house-furnishing, that the rising generation may appreciate that the poor home need not be bare and ugly, nor the rich home overcrowded with ostentatious display. The furnishing of a miniature house offers a valuable problem for both art and handwork, and one in which enthusiasm is sure to run high. Every opportunity for satisfying real needs in a suitable and beautiful way should be turned to account. For example, the furnishing of a rest room or a social room, the making of draperies or of other needs for the school office, furnish real problems of vital interest.

The writer finds little to criticize and much to commend in the work in household arts, and the suggestions here offered point to extension rather than modification of the work being done. The courses are well organized in line with the approved practice of the day and are all well carried out, so far as it is possible to judge from a brief observation.

CHAPTER XVI.

HYGIENE AND MEDICAL INSPECTION.

Water R. Smith.

THE TEACHING OF HYGIENE.

PHYSIOLOGY, like the other sciences, had gradually to force its way down through the school curriculum from the universities. The result was, as in the case of the other sciences, that during its early public-school stages it was burdened with technical details and a scientific nomenclature that removed it from active influence in the thinking of the boy and girl.

The early physiology was almost purely scientific. It came from the universities and the preparatory studies of a medical course. First it was concerned chiefly with the anatomy of the human body. Then it dealt largely with the chemistry of organic action. Gradually hygiene was introduced. It was a mere incident, however, in the study most of us were put through. We studied the bones and muscles and the circulatory and nervous systems for information. But recent changes have demanded that the hygiene of the human system be made the important part of the study. The names of the bones and nerves and the nature of the circulation and the digestive process are subordinated to the teaching of what to do in case of an injury, how to prevent the spread of infection, and how to eat and to live in order to preserve organic efficiency. Physiology and anatomy are used only as a basis for teaching the art of preserving health and building up strength.

In Leavenworth the transition is complete and the newer point of view prevails. The primary aim is as it should be—to teach health rather than to instill scientific knowledge. But in making this transition, hygiene and physiology have been dropped from the list of real studies. They have become merely "incidental minors"; and while better results are obtained than with the old scientific physiology, it is quite plain that this subordination lowers the standard of work that might be done. The writer believes that at some point in the grades room should be made in the curriculum for hygiene as a "major" study. Its importance in the scheme of life makes it worthy of special emphasis. Without the inspiration of medical examinations or of a nurse, however, it is evident that in most cases, with all the other specific demands upon a teacher, hygiene would receive very incidental attention. This is true not merely in Leavenworth; it is true under similar circumstances everywhere, and must so remain until the health work of the schools is put upon an organized basis.

CLASSROOM WORK.

The regular study of physiology and hygiene is taken up as science reading at the middle of the seventh year. Krohn and Crumbine's Graded Lessons in Physiology and Hygiene is used as a text, and supplementary reading is added. Two twenty-five-minute periods per week during the second half of the seventh year and all of the eighth year are

given to the study. In the recitations visited the text was read aloud, without preparation, paragraph by paragraph. After the reading some pupil was asked to summarize the material of the paragraph. Then followed questions and general discussion. The pupils came to the text, which is an excellent one, with open and unsated minds, and were interested in the reading. Teachers were working with the pupils rather than for them. By this free-and-easy method discussions of health and sanitary matters were stimulated. Occasional reviews are given, one of which was observed. In this the pupils showed not only real interest in the subject but knowledge of it.

This class and social study led the pupil and teacher to get together in more effective team work than in the set recitation. In many ways the best teaching the writer observed in the whole system was in these classes. Shortened periods and lack of provision for outside preparation, however, necessarily prevented problem study or extended laboratory work. Yet as a whole it may be stated that the evil effect of subordinating the study of hygiene to less fundamentally important ones like formal arithmetic and technical grammar was minimized, if not nullified, by the excellence of the pupil-teacher team work and the generally effective teaching found.

MEDICAL INSPECTION.

While the work in physiology and hygiene given was properly directed towards a study of health and its requirements, there was a complete omission of any effort at medical inspection.* This was not due to any lack of vision on the part of the school authorities. Its need was recognized by the superintendent and principals and its adoption recommended. But as in many other cities, the board was slow to act and the community indifferent or hostile.

This indifferent or hostile public attitude, which is not peculiar to Leavenworth, makes it worth while to discuss briefly the general proposition of medical work in the schools.

While medical inspection of school children is new in the United States, it has passed beyond the experimental stage. It is "a movement national in scope in England, France, Germany, Norway, Sweden, Austria, Switzerland, Belgium, Japan, Australia and Tasmania. It is found in the more important cities in Denmark, Russia, Bulgaria, Egypt, Canada, Mexico, the Argentine Republic and Chili. In the United States regularly organized systems are in force [1911] in nearly one-half of the cities [443], while a beginning has been made in nearly three-fourths of them."[1]

Dental inspection is carried on in nearly 200 cities, and 102 cities employ school nurses. Medical inspection laws have been passed in twenty states. The movement in this country started in Boston just twenty years ago, although it was then half a century old in European

* This statement should be qualified as follows: On entrance to the schools the parents of the child are required to fill out a blank stating whether or not the child has defective sight, hearing, throat and teeth. This information is filed, and when defects are remedied a note is made of it.

1. Gulick and Ayers, Medical Inspection of Schools. Published by Russell Sage Foundation, 1913.

states. No other educational movement has ever spread so rapidly or justified itself more fully.

The argument for medical inspection is definite and conclusive. The case is summed up by Dr. A. H. Hogarth, an English specialist, from the standpoint of the state, the school and the child:[2]

ADVANTAGES TO THE STATE.

"The state requires a physical census of the children for the discovery of unrecognized defects, partly with a view to the improvement of the national physique, and partly with a view to the preparation of all children for school life. It is also a national duty to arrange for the classification of children according to their mental capacities, and to adapt the educational system to the requirements of the several groups of children, in order to diminish the present economic wastage of misdirected educational efforts."

Messrs. Gulick and Ayers present the following pertinent statements regarding the case for the state:

"The jurisdiction of the state in assuming the function of education and in making that education compulsory is to insure its own preservation and efficiency. . . . But the well-being of a state is as much dependent upon the strength, health and productive capacity of its members as it is upon their knowledge and intelligence. In order that it may insure the efficiency of its citizens, the state through its compulsory education enactments requires its youth to pursue certain studies which experience has proved necessary to secure efficiency. Individual efficiency, however, rests not alone upon education or intelligence, but is equally dependent on physical health and vigor. Hence if the state may make mandatory training in intelligence, it may also command training to secure physical soundness and capacity."

ADVANTAGES TO THE SCHOOL.

"It is the duty of the local authorities to protect the individual against communicable diseases in school, to supervise school buildings, and to secure healthy surroundings for the school child."

Gulick and Ayers state in addition:

"Teachers and parents are beginning to realize that the problem of the pupil with defective eyesight may be quite as important to the community as that of the pupil who has some contagious disease. A child who is unable to see distinctly is placed in a school where physical defects are unrecognized and disregarded; headaches, eyestrain and failure follow all his efforts at study. . . . Neither he nor his teacher knows what is the matter, but he soon finds it impossible to keep pace with his companions, and becoming discouraged, he falls behind in the unequal race.

"In no better plight is the child suffering from enlarged tonsils and adenoids, which prevent proper nasal breathing and compel him to keep his mouth open in order to breathe. Perhaps one of his troubles is deafness. . . . Public schools are a public trust. When a parent delivers his child to their care he has a right to insist that the child under the supervision of the school authorities shall be safe from harm and shall be handed back to him in at least as good condition as when it entered school."

2. Medical Inspection of Schools, p. 78.

ADVANTAGES TO THE CHILD.

"Owing to ignorance, neglect, or apathy on the part of parents, it becomes a requirement of the merest humanity to bring medical aid and special educational methods within the reach of the individual child."

To which may be added from Gulick and Ayers:

"The child himself has a right to claim protection. The child has a claim upon the state and the state a claim upon the child which demands recognition. Education without health is useless. It would be better to sacrifice the education if, in order to attain it, the child must lay down his good health as the price. Education must comprehend the whole man, and the whole man is built fundamentally on what he is physically."

Also:

"Communities are seeing the whole matter in a new light. Gradually they are beginning to ask, not whether they can afford to take steps to safeguard in schools the welfare of their children, but whether they can afford not to take such steps. The realization is dawning that it is unbusinesslike to count carefully the cost of the school physician, but to disregard the cost of death and disease, of wrecked hopes and dependent families."

Additional facts are brought out, to show the need of medical inspection, by Dr. Louis W. Rapeer in a conservative statement of national and school health losses in the United States each year. According to his analysis, based upon excellent authorities, 670,000 persons die each year of reasonably preventable diseases, entailing an economic loss of over a billion dollars. There are constantly about 3,000,000 persons seriously ill in the United States, largely of preventable diseases, causing an economic loss of another billion dollars. A very large number of other persons suffer from minor ailments which lower their efficiency and cause absence from work, which makes a further very large economic loss.

The school health losses are also shown to be appalling. Sixty-five thousand school children die each year, at least 40,000 of reasonably preventable diseases. In addition, ill health and physical defects function largely in causing about 15 per cent of the eliminations, 16 per cent of nonpromotions and 17 per cent of retardations of the school children.

DISEASES AMONG SCHOOL CHILDREN.

Another phase of the problem appears when we examine the figures showing the actual presence of diseased conditions among school children. The English inspectors report that 80 per cent are suffering from defective teeth, 50 per cent are affected with vermin or other parasitic conditions, 20 per cent have defective vision, and 10 per cent are retarded in their educational progress by physical defects such as anemia, general debility, and deafness resulting from adenoid growths or discharging ears. Doctors Gulick and Ayers estimate that for the United States, in the average city school system, about 65 per cent of the children have physical defects serious enough to warrant treatment by a physician, oculist or dentist. Nearly 85 per cent of all these defects are those of teeth, throat, eyes and nose.

Taking the most serious of these defects—that of sight—the examination of hundreds of thousands of school children has shown that from one-

tenth to one-fourth suffer from defective vision serious enough to interfere with efficient work and permanently to injure their eyes. Defects of hearing are almost as serious. And "most important of all, *only a small minority of these defects of sight and hearing are discovered by teachers or known to them, to the parents or to the children themselves.*"

Another fact to be borne in mind is that these defects are not confined to the children of the poor. They are almost equally numerous among children of well-to-do parents. And in medical inspection where follow-up methods are used in addition to notification of parents, the percentage of treatments obtained is as great among the poor as among other classes. Mere notification secures treatment in 11 to 50 per cent of the cases, while follow-up methods frequently secure treatment in 75 per cent of the cases. In England treatment is secured in 20 to 70 per cent of the cases, averaging about 50 per cent.

THE SCHOOL NURSE.

The follow-up methods can be used effectively only where the board employs a school nurse. Her duties do not end with the schoolroom; they merely begin there. The case for the school nurse has been well summed up as follows (Gulick and Ayers Medical Inspection of Schools):

"She is the teacher of the parents, the pupils, the teachers and the family in applied practical hygiene. Her work prevents loss of time on the part of the pupils and vastly reduces the number of exclusions for contagious diseases. She cures minor ailments in the school and clinic and furnishes efficient aid in emergencies. She gives practical demonstrations in the home of required treatments, often discovering there the source of the trouble, which, if not discovered, would render useless the work of the medical inspector in the school. The school nurse is the most efficient possible link between the school and the home. Her work is immensely important in its direct results and far-reaching in its indirect influences. Among foreign populations she is a very potent force for Americanization."

It is not to be supposed that any sort of medical program can eliminate all the needless losses from death and ill health; nor is it to be expected that any sort of medical inspection or hygienic development will prevent all the illness and death losses among school children. The enormity of the problem, however, should not deter us from making an effort. Germany and Sweden have succeeded in decreasing these losses much below our own. England has organized her efforts to build up the general health scientifically. Every civilized nation is attacking the problem.

In the United States three-fourths of our cities (722 in 1911) are realizing the seriousness of the problem and the greatness of the opportunity for the schools, by making at least a beginning in medical inspection. Leavenworth can not afford to lag behind. The need is not less than elsewhere, nor the poverty of resources greater. A beginning should be made next year.

POSSIBILITIES IN LEAVENWORTH.

After canvassing the local situation, there appear to be four possible methods of approach: free medical inspection, the employment of a part-time or all-time physician, the nurse-alone plan, or a combination.

In regard to the first it may be stated that a few years ago a proposition was made by the local medical society to examine all pupils free of charge. It was not organized, however, and there was enough general opposition to lead the Board of Education to neglect or refuse the offer. Such an arrangement could probably still be made. Inquiries among physicians indicated that they would gladly undertake it.

Free inspection, however, can never go far. Moreover, it has several dangers that need to be carefully safeguarded. Inexperience and inefficiency in the particular sort of work required, professional jealousy and selfishness, parental objections, and the question of free treatments, have sometimes led to trouble. It may not be the best way to begin, but it is one way; and once started it is not likely to stop. Most new school enterprises have started in tentative and often charitable ways and were so managed until public support could be obtained. If the work were started with free inspection there is little doubt that results could be obtained which would make the public glad to pay for more complete and efficient examination than any free agency could give.

The second method would be to employ a specially trained physician for all of his time, or two or more part-time physicians who could give one to three hours a day each. A physician who is expert in this sort of work is able to command a larger salary than the present situation would warrant the board paying in Leavenworth. So regular physicians would have to be employed on part time. This would be preferable to free examinations, but would have definite limitations. Little remedial or follow-up work could be attempted, though this is the most valuable kind of service medical organization can render to the schools.

The nurse-alone plan would be superior to either of the first two mentioned for Leavenworth. A competent and scientifically trained nurse could be employed as cheaply as the part-time physicians. She could go from building to building, making tentative examinations, treating incipient and simple cases, and recommending doubtful cases to the family physician. Some contagious and infectious diseases could then be headed off and certain epidemics prevented. She could train teachers to more careful and expert observation and aid in more prompt action. Cases could be followed up by visitation to the homes of some of the children, where parents could be advised regarding methods of preventing the spread of disease and of treating simple maladies.

The fourth plan is the only complete and wholly satisfactory one. It would consist in the appointment of the expert physician, to be aided by a specially trained nurse. The physician could organize the inspection and examination of school children, advise the school architect and Board of Education regarding sanitary matters, direct the teaching of hygiene, aid the physical director, and correlate all the health agencies of the schools. The nurse could aid in the ways previously mentioned, and is particularly useful in making effective the recommendations of the physician. This complete program would be more expensive to start, but would more fully justify itself in the end. Whatever is done at present should look forward to this plan as an ideal.

PLAN RECOMMENDED.

After canvassing the local situation and discussing it fully with other members of the Survey Staff, the writer is ready to recommend that for next year the nurse-alone plan would probably be best for Leavenworth. The work in hygiene needs to be organized fully and effectively. To employ a physician with the requisite special and technical training for this purpose would cost more than the financial situation would warrant at present. A nurse could make a beginning of this organization and enlist the aid of the medical fraternity. As the opportunity appears, medical examinations could be added and the other phases of school hygiene correlated. When experience has justified additional expenditure and knowledge has opened the way for complete organization, a trained supervising physician can be employed to coördinate all the phases of school health work and administer them efficiently. Great care, however, should be shown in employing a nurse, since her work would be not only technical but administrative and constructive. It would not be less important and responsible than that of one of the building principals, and the salary should be fixed accordingly. This program may well be undertaken with the opening of the autumn term.

CHAPTER XVII.

LANGUAGE.

Minnie E. Porter.

TRAINING in the use of language means training in self-expression. The teaching of language has taken on a new and wider significance with the modern view of education—the development of the individual child through the *expression of self* in a *social situation*. A child is the one who expresses himself to others through the medium of language and the one to whom others give expression of their own impressions or experiences. A child is both creator and interpreter.

As a reader or a listener the child adds to his life experience, with its limitations of age and circumstances. But the experiences into which he enters imaginatively through reading may be none the less vital than those which he lives in reality. It is to these experiences, both real and imaginary, that he desires to give expression. The simplest form of social expression for a child is his own language.

In this report reading is considered in a separate chapter, but the relation of reading to the life experience and the self-expression of the child has been constantly kept in mind.

STANDARDS.

Motives for training in the use of language arise from the language needs of boys and girls. These needs are real, not imaginary. The ability to state his own case, to make himself understood, to share an interesting experience with others, are real needs of any pupil. But all of these needs imply social relations. The need of complying with accepted standards of good usage in the matter of language is as imperative for a boy as are neckties and other matters of conventionality in dress. No boy will wear a necktie tied in the back, because he must conform to what is customary among his mates. In the matter of language, the problem for the teacher is one of establishing common social standards within a group of immature pupils.

With such motives as a basis of effort in the effective use of language, the pupil necessarily acts upon his own *initiative*. The conditions of effective expression demand that he decide upon what he wishes to express. Whatever the case may be, the occasion must be a real one, the audience or reader a real one, and the boy's idea must be his own, if he would express himself clearly and forcibly.

If the pupil is in earnest he begins a process of *evaluation*. If his idea, the statement of his own case, is to be made effective, he is forced to decide what to say and what not to say. This process of evaluation is not carried on successfully unless the reader or the audience is taken into consideration.

The successful presentation of his own case, or the narration of a story, is not possible without *organization*. The pupil must decide upon

what comes first, what is of greatest importance, and what shall be the conclusion of the whole matter. The simplest writing or speaking, to be effective, must show consideration of beginning, middle, and end.

THE TEACHING OF LANGUAGE.

With these standards set up for the teaching of language, what is the teacher's place? What is her service? This teaching of language is not concerned with drill upon facts about language, with definitions in grammar and rhetoric, but it is concerned with actual doing as contrasted with acquiring knowledge of facts about language. Take, for example, the definition, "A sentence is a group of words expressing complete thought." This is a fact about language. Pupils of Leavenworth are being drilled upon this definition in all grades, from grade four to the second year in High School. Drill upon this definition for six years has not aroused a consciousness of the meaning of the word "complete" as it is applied to a sentence. With a class of first-year pupils in High School a teacher was observed struggling with this difficult problem in oral composition. In the actual doing, the problem is simple. We decide to say something about something, and when we have done this thing there is a consciousness of completeness, of unity, of a purpose fulfilled. The definition of a sentence, the statement of a fact about language, has no value apart from its application—the use of a sentence as a unit in speech. The consciousness of a sentence as complete arises from the use of sentences in the real expression of the child.

If knowledge of the facts about language, including grammatical structure and rhetorical principles, remains abstract—cut off from application to the pupil's own language, which is free and spontaneous—then the teaching of language will be termed in this report *formal*, as distinguished from that which is *real* and *vital*.

The first essential, then, is the establishment of habits of correct and of effective expression, for the child himself, as he is called upon to meet the social demands of writing and speech. This standard is to-day one which the teaching of language has as its goal in the elementary school. This period of learning by doing reaches to the end of grade six, which is now looked upon as the real transition between elementary and secondary education.

In the program outlined for the teaching of language in Leavenworth this purpose is emphasized in grades four, five and six. In addition, the program provides for a systematic study of formal grammar and for training in composition in grades seven and eight. There is in Leavenworth, at present, a movement toward the study of the problem of language teaching above grade six as one which presents problems more closely related to those of the High School than to those of the elementary school. This report on the teaching of language in Leavenworth is based upon the division at the end of grade six.

THE TEACHING OF LANGUAGE IN GRADES FOUR, FIVE AND SIX.

This report involves (1) an examination of the program outlined for these grades, (2) a study of the methods of teaching, and (3) an estimate of the results obtained. The program has been examined for the purpose of determining what provision has been made for training (1) in the art of self-expression both orally and in writing, (2) in the use of correct grammatical forms as habits of speech, and (3) in the knowledge of the technique of the English sentence as "the structural unit in the use of language." The methods of teaching have been studied in the written reports of the teachers, in conferences with them, and in the observation of actual work of teachers in the classrooms. The results obtained have been estimated by means of a study of the oral expression of the pupils during these observations, and by means of an examination of one hundred fifty compositions written by all of the sixth-grade pupils in Leavenworth in May, 1914.

The recommendations which are contained in this report are made on the basis of the study of actual conditions and problems. Owing to the limitations of time which have necessarily been placed upon these observations, and to the lack of comparative data upon which conclusions may be based, this report should be considered as suggestive rather than conclusive.

THE COURSE OF STUDY.

The examination of the program outlined for the teaching of language shows that the state textbooks, Scott-Southworth's Lessons in English, have been made the basis of the work—Book I in grades four and five, and Book II, pp. 1-78, in grade six. The emphasis in the textbooks is placed upon the training of children to talk and to write freely about things which they know. The outline in the textbook for composition work includes letter-writing, story-telling, and the recording of observations made in the study of plant and animal life. A recommendation made in the program outlined for grade five reads as follows:

"Never allow the children to write upon a subject until they are full of it. The way to get full of a subject is by *personal, active and living investigations.* This will lead you out of the schoolhouse and into many places in and around the city, *but it is the only way* to get the best for the children. In such investigations, of course, you will proceed by some previously outlined plan."

A provision has here been made for the communication of vital impressions and experiences, which are characterized by a personal feeling for the facts and the images to which the child desires to give expression.

The outline also provides for training in the conventional use of language—in grade four as follows: the proper oral and written use of ordinary singulars and plurals, possessives, and case forms of personal pronouns. In grade five this drill is continued, and additional training is provided in the use of singular and plural verb forms and of the principal parts of ordinary verbs. Training in the conventionalities of written composition includes the use, by habit, of capitals, periods, question marks, quotation marks, and the comma, of address, word series, and inverted phrase.

In addition to this provision for training in the habitual use of correct

forms in oral and written speech, training in the knowledge of the technique of the English sentence as the structural unit of composition is outlined as follows:

For grade five: "To have the subject concept, the predicate concept, the object, and in a general way the modifier concept."

For grade six: "To review sentences with respect to the four forms. To fasten the subject and predicate concepts, both the simple and complete. To study the phrase modifier and the clause modifier and build them into sentences. After building the sentence, to analyze it into its parts, and diagram. Use the pupil's own composition as illustrative matter in classifications, building, analyzing and diagramming. But such matter must be his own composition, not written for the purpose."

Provision has thus been made, before the end of grade six, for a study of the technique of the English sentence, simple or complex, as it is *related to the pupil's own composition.* The application of this knowledge of the technique of the English sentence to the self-expression of the pupil is fundamental in all training in the use of oral or written language.

At the end of grade six, according to the program outlined, the pupils in Leavenworth have been taught to classify words according to their respective functions in the sentence; to recognize the case forms of personal and relative pronouns; to use the principal parts of ordinary verbs with *has* and *have*; to recognize the singular and plural forms of ordinary verbs; to recognize the subject, the predicate, the object; to recognize phrase and clause modifiers; to analyze and diagram simple, complex, and compound sentences.

EXAMPLES OF THE TEACHING OF LANGUAGE.

One teacher was observed in a class of fourth-grade boys and girls. This teacher kept the interest alive and the pupils active in a review lesson on nouns, adjectives, and verb forms. The lesson was marked out from other lessons observed as being, not a memory drill and review of these topics in formal grammar, but a lesson in application, in which nouns and verb forms were discovered as necessary in the real language of pupils. The boys and girls enjoyed a lively conversation about subjects of interest in the classroom and in their activities outside. One little girl who wore a bright pink dress heard the sentence, "Mary's pink dress is pretty." The correct tense forms of verbs were made necessary as pupils were busy telling of their activities. The writer learned about a ball game: "Updegraff was playing ball last Saturday." This training was not limited to the conversation. News items were, likewise, written upon the blackboard. Of the lessons observed, this was one of the best examples of the careful work of the teacher in building habits of correct speech into the free, spontaneous language of children.

Such work may be contrasted in its effectiveness with the formalism in teaching in which another followed with the pupils an outline of nouns and adjectives on the blackboard:

"Mary may begin." (Mary rises.)
"You may give me a noun in the plural."
The noun is given correctly.
"A noun ending in *y*."
The plural of a noun ending in *y* is given correctly.
"You may name some adjectives for me."

Could a boy or girl think that those adjectives would be useful to that teacher? Such work remains purely formal and abstract. It is accomplished without any real motive behind it.

The writer observed a lesson upon the essentials of a sentence (Lessons in English, Book II, page 12). The class consisted of eight boys and six girls in the sixth grade. The lesson began with a review:

TEACHER: What is a sentence?
PUPILS: A group of words making complete sense.
TEACHER: *A large tree* is a group of words. Is it a sentence?
PUPIL: No.
TEACHER: Make it a sentence.

Assertive, interrogative and imperative sentences, with examples of each, were readily but uselessly given by the pupils. The new work for the day's lessons was then undertaken. The teacher had prepared on the blackboard a group of sentences. The pupils, in turn, were asked to go to the blackboard and mark subject and predicate, simple subject and predicate, and modifiers, as follows:

The *leaves* of the tree *fall* every autumn.

Sentences in the textbook were studied in the same manner.

The boys and girls in this class were interested for two reasons: They enjoyed the mental and physical activity of going to the board to mark the essentials of the sentences; they were pleased to be able to correct the mistakes made by their mates. Yet the work showed no opportunity of initiative on the part of the pupils in the use of language. The teacher had made plans and was in the foreground during the recitation. The teacher and pupils, however, were working together in a happy personal relation. The pupils were willing to work, and from the standpoint of formal instruction and the acquisition of formal subject matter the results would be considered highly satisfactory. Yet no application was made to the real needs of these pupils for training in language, although the teacher explained to the writer that few of these boys and girls would go to High School and some would not finish the eighth grade.

In this group of fourteen it would have been quite possible for the teacher to find in the compositions of these pupils examples of their failure to recognize the essentials of a sentence. A teacher need not look far to find, in the language of the sixth-grade pupils, two types of failure in sentence structure: (1) a part of a sentence set off by a period as if complete, and (2) a sentence which runs on and on because the pupil does not feel the sense of completeness when he has said the one thing which he intended to say about his subject. The difficulty of applying to writing and speech the knowledge that a sentence is a group of words making complete sense does not arise from an attempt to write a single isolated sentence, nor is the difficulty to be found in the recognition of the essentials of a sentence *previously constructed* for the pupil. In order to teach the sentence as the structural unit in the use of language, it is necessary that it be taught as a unit in composition in which the writer expresses himself with freedom and spontaneity. Thus the sentence becomes a unit in a discourse which moves easily from one thought to another. It is a structural unit which functions as a part of a larger unit of discourse, the whole composition.

COMPOSITION IN GRADES FOUR, FIVE AND SIX.

As a means of determining the nature of results obtained from the teaching of language in grades four, five and six, compositions of one hundred and fifty pupils, representing the total number of pupils in grade six, have been examined. The compositions were written for this purpose, in May, 1914, upon subjects of interest to pupils in Leavenworth. The papers were submitted without correction by the teachers.

The papers were read at first for the element of human interest, which depends upon the individuality shown in the expression of the pupils. While this element was not entirely absent in the work of any group of pupils, yet the results from different groups showed so much variation in the degree of self-expression that an attempt has been made to rank the work of these groups according to the element of human interest. In the tabulation this order is observed. The first column shows the work of the pupils from Lincoln, one of the colored schools, in which the element of human interest is strongest.

A second reading, from which notes were carefully made, was undertaken with a view of determining the fundamentals of technique which showed the greatest variation in the work of the pupils of grade six. An analysis of the results of this reading suggested that two points would serve as guides in determining the nature of the results obtained on the basis of the program outlined for the attainment in composition at the end of the sixth grade. The two points determined upon as those which would show the application of knowledge of the simple technique of the sentence in the written composition of the pupils are as follows: (1) the ability or failure to recognize a sentence as a group of words expressing a complete thought; (2) the ability to use, in connected discourse, a complex sentence.

The papers were read for the third time, and a count was made as follows: (1) Each paper in which a single failure occurred in the recognition of a complete sentence was counted a failure on that point. The number of such failures in one paper was not considered. (2) Each paper in which one or more than one complex sentence was used, was credited for that point. The results of this study apply to Leavenworth alone. The lack of comparative data on these points makes it impossible to reach any conclusion about the results of the effectiveness of the teaching in Leavenworth as compared with that of other cities. It is hoped that the results shown for the schools in Leavenworth will suggest to the teachers the possibility of determining the reasons for the variations. The test is simple, and covers but a few points in the study of a problem so complex as that of English composition. The results of this study are submitted in Table XXVIII:

TABLE XXVIII.

	Total.	Lincoln.	Sumner.	Morris.	Oak Street.	Third Avenue.	Franklin.	Maplewood.
Number of compositions examined.	150	7	10	23	28	43	17	22
Per cent of pupils who had all sentences complete.....	63	.....	50	74	46	84	46	73
Per cent of pupils who used one complex sentence.....	80	43	100	83	82	95	94	36

The results of this test may be interpreted by representative extracts from the pupils' compositions. For example, the result shown in the column for the Lincoln School may be interpreted by the following quotation from a boy's theme. The selection is marked by the joy and power of self-expression and by the element of human interest. It is lacking in the technique of the structure of the sentence.

A boy threw his line in the lake and a snake made him leave his line. he ran all around the bank hunting for a stick to kill the snake with and he killed the snake and laid it on the track and the train cut its head off. and when he pulled up his line he had a crawdad and he took its tail for bait.

There is no doubt that this boy, with real, vital impressions and a story which had stirred him, has taken delight in expressing himself sincerely. By expressing himself with freedom and spontaneity he has made an appeal which is true to human nature. His story shows a movement from the beginning to the climax of the reader's interest. He has interwoven two related incidents successfully. These qualities, which characterize genuine literary expression, must be preserved in his work. The writing, of course, is lacking in the technique of sentence structure. He has a number of ideas to be expressed; each is complete in itself. But these ideas are also related ideas, some of which are subordinate to others. These are the problems in technique for the instruction of the teacher. Any attempt to improve the technique of this work must be undertaken by the teacher with a view of preserving the qualities of expression which make a strong human appeal.

Contrasted with the example just quoted is one which is representative of a column ranking high in the technique of the sentence but low in human interest or in self-expression. Note the sperficial tone of children who write of a trip to Pilot Knob after this fashion:

We had much benefit by the trip.

Our teachers were very anxious to have us get all the good out of it so we would be able to write on it.

We were very tired but when we got our lunch we felt much better. And started our afternoon work.

We ate our dinner and then after a little rest we were ready for our afternoon work.

We went to the Knob for a grammar and geography lesson and to get specimens for drawing.

These pupils show some mastery of technique, but their composition work presents greater difficulty in the way of improvement than does that of the boy who writes the snake story. Spontaneity has been lost. The expression is insincere and artificial.

Another column shows (1) little expression of self; (2) a knowledge of the sentence as a complete thought; (3) a high percentage of pupils who did not use a single complex sentence. The following quotations will serve to show the immaturity of the pupils in their use of the sentence. The two quotations were selected because they show the level of uniformity which was characteristic of the work of more than twenty pupils.

(1)

We have an ice cream social the latter part of each year. Our ice cream social will be May 26th this year. The Huffman Music Co. will come out to our school grounds. We can have music.

We have it on the school grounds. We have a large yard. The north side of our school grounds has grass on it. We also have large shade trees.

(2)

We have our Ice cream Social the latter part of every year. This year it will be May 26th, 1914.

We have a large yard, and also very nice grass. We have several large shade trees. We have our tables under our shade trees.

These quotations are additional evidence of the result of teaching formal technique and the failure to apply the knowledge of the use of phrases and clauses to the real language of the pupil.

One column, which represents work strong in technique, with some element of human interest, shows the results from the compositions of pupils who wrote upon the "Autobiography of a Penny." Such a subject is artificial and of doubtful value. These pupils might have done better with a subject which approached more nearly the demands for genuine self-expression. In contrast with the simple undeveloped sentences just mentioned, these quotations show some maturity in composition:

While I was lying under the window for almost two weeks, I was stepped on by a man who put me into his pocket and said, "I think this will bring good luck to me."

The boy thanked the man for me and then took me into a bakery and bought a cake for his dinner.

I am still in the bakery and am very tired looking at cake and pie.

I like best to travel around with little children from one store to another.

One class, that made almost the same record as the one writing about the penny, wrote about the story hour in their school. Some of the pupils said that they like stories because they rest the mind. Others who were really interested told stories. The following extract shows the pupil's ability to carry forward the movement in the story. It also shows that this pupil is not always able to recognize a complete sentence as a structural unit in his story. The composition reveals the points at which he needs the help of the teacher to arouse in him a consciousness of the sense of completeness in a sentence.

The Town Musician is a good story about a donkey that was going along the road braying because his master thought he was too old to work so he chased him away. *When* he thought of his good voice and said he would go to Brenan to be in the band. He then met a dog, a cat, and a rooster. Then they were resting when the rooster saw a light. They went over where the light was and the donkey looked in the window and saw some robbers. So they made a plan that the donkey should bray, the dog should howl, and the cat should mew, and the rooster should crow.

The reproduction of a story which gives room for a play of the creative imagination of the pupil is one of the most effective means for the development of the use of language in these grades. The onward movement of the story in both oral and written composition tends to produce the sentence which runs on and on. It is in this work that the teacher finds it necessary to keep freedom of movement in the story, but to build into it the sense of the unity or completeness of a sentence. It is a difficult problem in these grades, but one which is fundamental.

For the columns which show a knowledge of technique both in the unity of the sentence and in the subordination of one idea to another, the writer has selected, from some compositions about Pilot Knob, the following quotations. Each quotation shows that the application of knowledge

of the technique of a sentence is necessary to self-expression—the aim of composition:

Some of the children went to gather violets and saw a snake which they thought was a rattler.

There were four of us girls who went into the woods where we saw a rattle snake.

We caught some fish, shot some squirrels, and ate all the apples and peaches we could.

The following quotations from an account of the pupils' visit to the Soldiers' Home show the same quality of self-expression combined with a mastery of sentence structure:

There is a very large white flag pole on the highest hill from which the red, white, and blue flag floats. It is raised at sunrise and lowered at sunset.

After the flag is down the men fold it up, but they are very careful not to let it drag.

THE ORAL USE OF LANGUAGE.

The oral use of language was judged by the following standards: (1) Is the use of language free and spontaneous? (2) Does it make the hearer acquainted with the individuality of the children as speakers? (3) Does the program show a provision for training in the habits of correct speech without inhibiting the real, vital use of spoken language? In the textbook and in the printed outline for grades four, five and six, oral composition is placed before written composition in the amount of time devoted to it and in the order of presentation.

In grade four, one teacher used successfully language games which provide for the repetition of correct grammatical forms. Such a device may easily become mechanical. In this case, however, the attention of the pupils was centered upon the thought, the expression of which was demanded by the activity of the game. Repetition of the correct forms, with the attention of the pupil centered upon the thought expressed, furnished valuable training for the ear, which becomes a guide in the use of correct forms in speech.

One form of oral composition which is being used in Leavenworth in these grades is story-telling. This form of training is well adapted to the child's interests during this period, and is a natural stimulus toward a growing freedom in self-expression. But story-telling is a creative art. The real story-teller will enlarge upon his story, will improvise and develop parts of the story as a composition which grows with the telling. This real story-teller is able to adapt the story to the interests of his audience. During the time spent in the classrooms the children were asked to tell some of their best stories. The results obtained showed two types of training in story-telling. In some cases the children told stories in a manner which showed the art of a genuine story-teller, an art of free and spontaneous expression which may be easily developed in children under twelve years of age. In other cases the children recited, in a stiff, stilted, artificial manner, stories which had been committed. In one case the children recited, in order, parts of the story. In such cases the language was correct but formal, while in the case of the real story-teller the genuine language of the pupil revealed some of the same crudities of speech that are found in the language used in the snake story, previously quoted.

In a class in grade five the pupils responded so readily with correct sentences in a drill in grammar that an attempt was made to test the effectiveness of this training in sentence structure in its application to the real language of the pupils. Some of the pupils were encouraged to tell stories of the early days in Leavenworth. One boy told a marvelous tale, which his grandfather had told him, about a man "who jumped clean across the creek." He became so much interested in his story that he revealed his real use of language. The teacher apologized for the boy's forgetting himself and consequently using such poor language.

LETTER-WRITING.

Letter-writing is a need felt by children from ten to twelve. The life of each school community creates demands for the writing of business letters. The principal of a building and the teachers attend to business letters for the school, which would provide motives for letter-writing for their pupils. In one school, which purchased a victrola as a community enterprise, there must have been sufficient business to call for a number of business letters in the raising of funds and in the purchase of the victrola. The teacher must have investigated the subject of the cost and the kinds of victrolas. This information might have been collected by the older pupils and reported to the school, orally or in writing.

The principals and teachers frequently telephone to the superintendent's office for supplies or for necessary repairs. If the needs were anticipated, requests might be sent to Mr. Morgan, the clerk of the board, in the form of business letters written by pupils. These letters would call for specific description and explanation of the supplies or repairs needed. The request would be made effective by the statement of the reason that these things are necessary or desirable. In one school illustrative material for geography is collected. To do this it is necessary for some one to write business letters to many firms. These letters may be written by pupils. The replies from them will be studied with more interest than the models given in a textbook. There are a number of problems involved in the writing of these letters. The teacher helps the pupils in meeting them successfully, but she does not take the responsibility.

These problems which arise for the boy and girl in the organized life of a school community, as well as in the world of affairs outside the school, will challenge a natural desire to meet real conditions and to achieve results. The subject matter of instruction in the use of language may be brought into the form of problems arising for boys and girls in many social situations found in the classroom, in the school community, and in the world of affairs. Herein lies a test of the teacher's skill.

RECOMMENDATIONS FOR GRADES FOUR, FIVE AND SIX.

We recommend the elimination of formal grammar in grades four, five and six, but ample provision for training in habits of use of correct speech, together with the mastery of the simple technique of the English sentence, as reasonable requirements in language study. In

Leavenworth this recommendation will result in economy of time and effort which may be expended in more helpful pursuits.

Some of the teachers have not yet recognized the social conditions in the school which provide motives and call forth the initiative of pupils in self-expression. As a consequence of this failure to recognize the influence of the demands of the environment of the pupils, and on account of the traditional ideas of the teaching of grammar as a formal abstract subject, training in language falls below the standard: the development of the child through the *expression of self* in a *social situation.*

The variations noted in the tabulations of the results obtained in composition at the end of grade six suggest that they are not due primarily to the home environment of the pupils, but to the point of view of the teachers in regard to what constitutes effectiveness in language teaching. With the same untiring industry which characterizes the work of these teachers, but with a changed point of view, the teachers of Leavenworth have within their possibilities of accomplishment the achievement of a high standard in the teaching of language.

GRAMMAR AND COMPOSITION IN GRADES SEVEN AND EIGHT.

Before the teaching of grammar had been observed, a simple test on fourteen points was prepared and given, in March, 1914, to all of the pupils in grade eight, numbering 137, and to 115 pupils who entered High School in September, 1913. In order to obtain some basis for comparison, the same test was given at approximately the same time to the eighth-grade pupils in Kansas City, Kansas, and Wichita. A total of 707 pupils of grade eight who use the same textbook were tested.

DIRECTIONS FOR GIVING GRAMMAR TEST.

This test is to be given by the regular teachers.

Give plenty of time for the test.

No explanation should be given to the pupil by the teacher for parts I and II.

In part III the teacher should say to the class, "This exercise calls for the writing of one long sentence and no more. No certain number of words is called for, and the sentence will not be judged by its length."

The answer to all questions are to be written upon the test sheet.

GRAMMAR TEST.

Name..... *School*..... *City*.....

Boy or girl..... *Age*..... *Date*.....

I. There is no man *in* Mexico whom the United States government *now* recognizes as the ruler of *that* country.

(1) Name the verbs in this sentence.
(2) What is the case of *whom*?
(3) How is *whom* used in this sentence?
(4) Name the parts of speech for the words italicized:
1. *in* .....
2. *now* .....
3. *that* .....

II. State the reasons which you have learned in the study of grammar for saying:

"I have seen him" instead of "I have saw him."

"Will you go with him and me?" instead of "Will you go with him and I?"

III. Write *one* sentence only. Let the subject of the sentence be your favorite hero, and let the predicate, with its modifications, tell the most wonderful thing this hero did.

The points considered in the first two questions are indicated. In the third, five points were considered: (1) the use of the favorite hero as subject; (2) what he did used as predicate; (3) period at end of sentence; (4) beginning name of hero with a capital letter; (5) following directions by writing only one sentence.

The test is simple. It does not cover many points in formal grammar which have been taught to these pupils. All of the fourteen points selected have been taught to pupils in Leavenworth at the end of grade six, with the single exception of the "use of *whom*," which is taught in grade seven.

Five points test ability to classify words in the sentence as parts of speech: verbs of two kinds, preposition, adverb, and adjective.

The adjective *that* was chosen because it is a word which may perform other functions in the sentence.

The word *whom* was chosen because it is an inflected form—a real case distinction as the language. Its use in a sentence must be understood.

The tense form of the verb *see* and the case form of the personal pronoun were selected for the test in order that it might be determined, if possible, how far these pupils are able to see some relation between their knowledge of formal grammar and the use of correct forms of speech. This test shows nothing of the knowledge of correct forms. This point was eliminated from consideration by the statement of the correct forms.

The assignment of "Your favorite hero" was made in order to center the attention of the pupil upon his own thought while writing a sentence. Upon such a basis it was the aim to test his ability to apply knowledge of the essentials of the sentence and to test his consciousness of a sense of completeness in a sentence of his own composition.

The papers of the pupils in Leavenworth were all scored by the writer, as were some of the papers in each of the other cities. The other papers were scored by two advanced college students at the Kansas State Normal School, under supervision. Each of these students has had experience in the teaching of grammar. The test leaves opportunity for few questions of judgment in grading. In the cases in which such questions arose they were referred to the writer for decision.

THE RESULTS OF THE TEST.

The general average, which is taken as a basis of comparison in Table XXIX, shows the per cent right on each point, in a total of 707 pupils in grade eight in three cities, including Leavenworth. No pupils of high-school grade were included in making up the average. The average for each city shows the per cent right in the total number tested in that city.

Although Leavenworth allows a greater amount of time for the teaching of grammar than is allowed in either of the other cities, the tabulation shows that it falls below the average in twelve points. In the column marked "High School" it is to be noted that these pupils fall below the pupils in grade eight in Leavenworth in eight points, but are above those pupils in six points which require thought.

TABLE XXIX.

Tabulation of Grammar Test.

	Leavenworth.	Kansas City, Kan.	Wichita.	Average.	Oak St.	Morris.	Third Ave.	Sumner.	Lincoln.	H. S.
Number of pupils tested in grade eight.	137	329	241	707	26	23	74	6	8	115
The verb *is*	97	97	100	98	100	100	94	100	100	95
The verb *recognize*	91	95	97	94	92	100	87	100	100	94
The case of *whom*	62	83	82	75	50	91	51	100	75	60
The construction of *whom*	17	55	48	40	.....	56	23	17	.....	19
To classify *in*	97	96	97	97	92	100	97	100	100	89
To classify *now*	92	97	94	94	85	100	82	100	100	68
To classify *that*	31	51	73	54	54	13	28	50	12	34
Tense form of verb *see*	39	65	39	48	38	27	37	100	25	32
Case of personal pronoun.	41	72	73	62	23	43	47	83	12	49
Subject of sentence	95	98	96	96	96	91	94	100	100	96
Predicate of sentence	91	97	97	95	88	91	90	100	100	92
Period	89	90	96	92	85	91	89	83	100	83
Capital s	94	96	98	96	96	91	94	100	87	75
One sentence only	94	93	96	94	92	90	94	100	100	87

In the naming of the verbs in the sentence, the results throughout show that *is* is named by more pupils than the verb *recognize*. This variation suggests that *is* may be named as a result of memory drill, while the verb *recognize* demands a knowledge of the use of the word.

The preposition *in* makes almost the same record as the verb *is*, and helps to strengthen the suggestion that the pupils succeed here as the result of drill in memory work.

The adverb *now* shows that this point is more difficult than those mentioned. Oak Street, with a score of 85, and Third Avenue with 82, show that this point is difficult. But the first-year pupils in the High School make a score of 68, the lowest record.

The adjective *that* and the "use of *whom*" presented the greatest difficulties of the points given in the test. These two points demand clear thinking upon logical relations in the matter of language.

TABLE XXX.

"That is an adjective."		*"Use of whom."*	
Wchita	73	Morris	56
Total average	54	Kansas City, Kan.	55
Oak Street	54	Wichita	48
Kansas City, Kan.	51	**Total average**	40
High School	51	Third Avenue	23
Sumner	50	High School	19
Leavenworth average	31	**Leavenworth average**	17
Third Avenue	28	Sumner	17
Morris	13	Oak Street	0
Lincoln	12	Lincoln	0

The word *that* may perform other functions in a sentence. The average of 707 pupils tested in these cities shows that only 54 out of 100, or approximately half of the number, were able to decide correctly upon the function of the word *that* as an adjective in the sentence given. But the wide distribution of the scores suggests that this variation may have resulted from differences in teaching instead of differences in abilities of pupils represented.

In contrast, however, to the use of the word *that*, the use of *whom*, if it be understood, becomes a conscious standard for correct speech. The average of 707 pupils tested shows that only 40 out of 100, or considerably less than half, were able to give the use of *whom*. As in the case of the word *that*, the scores show a wide variation. The average for Leavenworth is only 17 out of 100, although Morris made a score of 56, the highest in the list. Sumner makes a score of but 17, while Oak Street and Lincoln show zeros. The High School pupils have a score of 19 out of 100. This tabulation indicates that the teaching of the use of *whom* is difficult for all; but it is an essential which is taught in Leavenworth with a variation in results from 56 to 0.

The verb form *have seen* presents greater difficulties than does the case form of the pronoun. In the average for the verb form *have seen*, 48 out of 100 tested were able to give reasons; for the case form of the pronoun, 62 out of 100.

But here, as in the two points noted which require thought, there is wide variation:

TABLE XXXI.

"Have seen."		*"With him and me."*	
Sumner	100	Sumner	83
Kansas City, Kan.	65	Wichita	78
Total average	**48**	Kansas City, Kan.	72
Leavenworth average	**39**	**Total average**	**62**
Wichita	39	High School	49
Oak Street	38	Third Avenue	47
Third Avenue	37	**Morris**	**43**
High School	32	**Leavenworth average**	**41**
Morris	27	Oak	23
Lincoln	25	Lincoln	12

It will be seen from the foregoing tables that in the case of Kansas City and Wichita, 72 and 73 out of 100 are able to explain the use of correct form by means of their knowledge of the case of the personal pronoun. In Leavenworth 41 out of 100 are able to use these facts of language as standards for correct speech. But these cities show that there is greater difficulty with the verb form. In them only 65 and 39 out of 100 are able to explain the correct form, and in Leavenworth 39 succeed.

THE WRITING OF ONE COMPLETE SENTENCE.

The last assignment in the test, to "tell the most wonderful thing your hero did," did not serve to carry some pupils from the formal mechanical sentences used in grammar drills. Such sentences as the following occur frequently:

Columbus discovered America.
Lincoln freed the slaves.
Washington crossed the Delaware.

These sentences are all of one type, and it would be difficult for pupils to make any mistakes who remembered that this was a test in grammar. In the five points tested the average was between 92 and 96, with but slight variation in either Leavenworth or in the cities A and B. Sumner and Lincoln show *four* perfect scores in four out of five points here. Sumner has 83 on period at the end of the sentence and Lincoln 87 on capitals. It may here be noted that failure to recognize the end of a sentence occurred more often in the work of pupils who expressed something which showed their real interest in their heroes. One sentence written by an eighth-grade boy is as follows:

Jack Tompson was a scout during the out-break with the Apache Indians, he scouted at night and day with an indian scout called, Mendez, killed four with his gun, and cut two with his sword in one evening.

Two examples are chosen as representative of the work of pupils who fail to show a sense of completeness in writing a sentence. In each grade from the fourth to the second year in High School this definition is recited: "A sentence is a group of words expressing a complete thought." The first sentence was written by a boy, age 15, in the first year in High School, his tenth year in school:

One day my faithful dog hero saw another boy kicking another small boy, and he ran up and bit the big boy on the leg, and the big boy stoped kicking the small boy and went away crying, much to the small boys satisfaction.

The second was written by a boy 14 years of age, first-year class in High School, in his ninth year in school:

Mark the news boy was standing on a street car one morning when looking around, he saw on the opposite car a frame house in flames, he heard a cry from a window and with the aid of a box he climbed into the house, in a few seconds he came running out of the house with a little child in his arms.*

This test suggests that the pupils succeed in those points which depend upon formal drill and memory work. They are least successful in the points which require thought about the function of a word, as in the case of *whom* and *that*, and in those points which call for ability to relate their knowledge of grammar to correct forms of speech.

If the habit of correct use of language be established by doing, rather than by studying facts about language, at the end of grade six, then grade seven may be considered the time to begin the really systematic ordering of the facts of language gained by experience into knowledge of formal grammar. This is the view expressed in the second preliminary report of the National Committee. At present a review of grammar is given in the first year of High School or grade nine. The plan of distributing the work in formal grammar through grades seven, eight and nine, according to the increasing abilities of pupils to master this knowledge, is a suggestion of one means of meeting at present this problem of the intermediate school.

COMPOSITION.

When the amount of time and effort devoted to the teaching of grammar is considered, the results obtained are disappointing to its most hopeful advocates. But the amount of time devoted to the teaching of composition in grades seven and eight yields results that are encourag-

* This sentence and the two preceding are given only as representative of types of faulty sentence structure.

ing. Compositions written in May, 1914, by the pupils in the eight A classes have been examined. The compositions were written to give an account of the field meet in Leavenworth. They were written to give information, and not as compositions or school exercises. They have been submitted without correction.

The papers were first examined for the two points in the technique of the sentence which were studied in the writing of pupils of grade six. The following tables, with a comparison of results obtained at the end of grade six and the end of grade eight, show that in two years pupils have acquired the use of the complex sentence. But one pupil failed to use a complex sentence.

Ability to Use a Complex Sentence.

	Total.	*Lincoln.*	*Sumner.*	*Morris.*	*Oak Street.*	*Third Avenue.*
At the end of grade six.....	80	43	100	83	82	95
At end of grade eight.....	99	100	100	100	97	100

The sentences showed a mastery of a variety of means of subordination. Relative clauses are used, but no pupil in grade eight made use of the relative *whom* in his composition. As this proved to be the most difficult point in the grammar test, there is a suggestion that the use of *whom* requires a more mature grasp of sentence structure than is found among pupils of this grade.

There is a marked gain in ability to recognize a sentence as complete. Of the papers examined, one pupil made five errors on this point, one made four, one made three, five made two, and all others who failed on this point made but one error.

In the following table it will be noted that a comparison has been made between the pupils of grade six and grade eight in their respective abilities to recognize a sentence as complete. There is also a comparison of abilities of pupils of grade eight in recognizing a sentence as complete when it is a unit in composition, and the abilities of the same pupils when they are asked to write one sentence only as in the grammar test.

Percentages of Those who Recognize a Sentence as Complete.

	Total.	*Lincoln.*	*Sumner.*	*Morris.*	*Oak Street.*	*Third Avenue.*
End of grade six.....	63	0	50	74	46	84
End of grade eight.....	74	33	50	100	70	86
In grammar test.....	94	100	100	90	92	94

These results show that on entering High School in September, 1915, approximately one-fourth of these pupils must be trained to develop a sense of completeness as applied to a sentence when it is a unit in composition.

Another feature of the compositions written about the field meet, which show some maturity, is the development of the idea of a paragraph. The paragraphs are crude, but show a consciousness that some sentences should be grouped together because they tell about the same things. The plan for grade eight includes a systematic study of the paragraph. The textbook supplies the definition: "A group of sentences that belong together because they are all about one idea is called a paragraph."

CHAPTER XVIII.

MANUAL TRAINING IN GRADES FIVE TO EIGHT.

Ella V. Dobbs.

HANDWORK in the elementary school serves two purposes. It may be an orderly progress in learning how to use tools and materials by accepted methods. In technical handwork chief emphasis is placed upon execution, and the pupil accepts its methods upon the authority of the teacher.

Handwork may also be used as an illustrative factor in teaching other subjects, especially geography and history. Illustrative handwork places emphasis upon effect rather than technique, and the worker is allowed free play for his ingenuity and imagination.

Both types of work are needed in a well-rounded course. In the lower grades, while the undeveloped muscles of the children prevent great precision of movement, a large use of illustrative work tends to give a general acquaintance with materials, their properties and uses. A few technical processes are within the powers of first-grade children. The desire and need for definite control of tools increases year by year. These conditions suggest a large use of free work in the lower grades, with increasing emphasis upon execution until work of the technical type predominates in the upper grades.

TECHNICAL HANDWORK.

Technical handwork includes definitely organized courses in various materials, wood, paper, cardboard, metals, textiles, etc. Among these the school must choose that type of work which is best suited to the needs and ability of the children for whom it is planned, which will appeal most strongly to their interests and furnish the strongest motive for effort, and at the same time develop to the highest degree their ability to think and act independently.

ILLUSTRATIVE HANDWORK.

Illustrative handwork has neither time nor subject matter of its own, but is used by the regular teacher when it serves to present a topic more clearly. Its value depends upon the opportunity it offers for self-expression and self-directed activity. This value is lost unless the children are allowed to work out their own problems with a minimum amount of supervision and assistance. Illustrative handwork includes the making of posters and booklets and small representations of interesting things described in the textbooks, such as the cotton gin, the first steamboat, the *Merrimac* and the *Monitor*, canal locks, ancient and foreign methods of transportation, tools and cooking utensils of other lands and other times; also sand-table representations of interesting scenes, industrial processes, and any topic which may be made more interesting or more intelligible through the use of concrete expression.

Two important considerations enter into the evaluation of a course

in handwork, *i. e.*, that illustrative work shall be appreciated for its illustrative value and thought-provoking power without regard to its technical imperfections; and that technical courses shall begin with processes that the children understand and can perform with ease, and shall keep pace with their development in power to execute.

HANDWORK IN THE LEAVENWORTH PUBLIC SCHOOLS.

Handwork is provided for all students in the elementary schools of Leavenworth. In grades one to four simple exercises in paper and cardboard, weaving and basketry, are planned for boys and girls, under the direction of the supervisor of drawing. In grades five to eight the boys and girls work separately.

Boys of the fifth grade have a series of exercises in cardboard. Sixth-grade boys have a course of knife work in thin wood. Boys of the seventh and eighth grades have bench work in the manual training shop at the High School. Eighty minutes per week are devoted to these courses. In addition to these regular handwork courses, numerous projects in handicraft and applied design are given to both boys and girls in the four upper grades as a part of the work in drawing.

The type of work throughout the courses is that already described as technical handwork. It bears the impress of both the sloyd and Russian systems, and consists in each case of a definite series of exercises to be worked out by each pupil, the chief end in view being the mastery of common tool processes with a fair degree of skill. Until these processes are mastered the pupils follow definite plans made by the teacher. After the tool exercises are completed, some freedom is allowed in the choice of projects to which these fundamental principles may be applied. These projects include match boxes, necktie racks, coat hangers, bird houses, book racks, taborets, and numerous other small articles which may be used in the home.

A course in the reading and making of working drawings accompanies the work in wood. The first exercises are made from working drawings made by the teacher on the blackboard. For the next group of exercises each pupil makes a copy of a working drawing which has been prepared by the teacher. For more advanced work each pupil makes a sketch of the thing he proposes to make, and from this sketch he makes a complete working drawing.

In making a broad, general comment upon the work of this department, the writer would say that, with a few exceptions, all of the work that is being done is being well done. It accomplishes with fair satisfaction that at which it aims. And before any specific criticism of the various phases of the work is made, it should be stated that the general plan of work corresponds to and compares well with much, if not most, of the accepted type of work throughout the country. It has some features in which it is superior to the common practice. For example, the seventh- and eighth-grade boys have access to the very well equipped shop at the High School, where they work at the turning-lathe as well as the carpenter's bench, and become familiar with other machinery in use there. In a large percentage of manual-training systems the grade pupils handle the carpenter's tools only.

GRADES FIVE AND SIX.

The course for the fifth-grade boys consists of a series of small models in cardboard, such as a pinwheel, wall-pocket, calendar, blotter, handkerchief case, etc. In making these models each pupil draws directly upon the cardboard the pattern which the teacher dictates. The article is then cut out, folded, and pasted or tied into shape.

The course in knife work for the sixth-grade boys consists of nine small articles made from thin pine, with the working drawings which accompany them. The list of articles includes a thread or fish-line winder, a key tag, a paper file (hexagonal base), paper knife, picture frame, key rack, whisk-broom holder, match strike, and match box. For these definite plans are prepared. The pupils copy the teacher's plan, first on paper and then on wood, adhering strictly to the dimensions of the original plan.

The tools used in this course are a compass, knife, and tack hammer. A very convenient kit, designed and made by the supervisor, holds both tools and materials. One side of the kit serves as a drawing-board, and the other side as a cutting-board, which protects the desk from injury, the work being done in the regular schoolroom.

Judged from the standard of technical handwork, these courses are open to question as to whether the subject matter chosen is of the form best suited to the needs and ability of the children for whom it is intended, and offers the strongest motive for their activity. The form of work chosen should not only meet these needs, but meet them more adequately than any other forms of work which might be used. It must not only get results, but get the best results.

The use of a single tool in the sixth grade limits the possible operations to be performed and confines the work chiefly to flat projects. To obtain variety in these some geometric forms are introduced involving operations which are difficult to perform with a satisfactory degree of technical accuracy. For example, the third model in knife work is a hexagonal piece of wood with a beveled edge—an exercise in whittling which requires considerable skill if a high standard is maintained. The range of projects in flat work is limited, and interest demands the introduction of some models of the box type. It is difficult to make a well-fitted box in quarter-inch wood, even with a full set of tools. It is more difficult when the work must be done with a knife only. Two models of the course require fitted joints. The unprotected blade of a sharp knife is one of the most dangerous tools, and very unsafe for the use of unskilled hands. If the knife is not sharp, accurate work with it is impossible.

The introduction of other tools would greatly increase the number of possible operations and would permit a more interesting type of projects, thereby strengthening the motive power of the work. The addition of the coping saw to the tools to be used would greatly increase the possible scope of the work. Coping-saw work offers opportunity for making mechanical toys, three-ply animals, balancing figures, and a great variety of projects which appeal strongly to the dominant interests of small boys and at the same time involve serious problems in mechanics. Mechanical toys offer a strong motive for good workmanship, since the toys must be

well made or they *will not work*. Work of this type may be presented in a way which will call into action the child's best thinking powers. Its best values are lost when the pupils are provided with accurately prepared plans exclusively. It is often better to exhibit a toy which they will wish to make, and let them study its mechanics and work out plans of their own. Variety in methods and dimensions is greatly to be desired, and attention should be directed to the value of one solution over another through a comparison and criticism of results.

These courses are also open to question through their lack of opportunity for initiative. If it is accepted that technical handwork shall develop ability to think and act independently, the subject matter chosen must in some measure require the worker to compare, choose and execute upon his own responsibility. When a definite course is planned by the teacher, and the pupil merely copies models, opportunity for this sort of development is very small. Granting that there is much to be gained in intelligently hearing or reading directions and executing them with faithfulness and accuracy, overemphasis on this point must tend to one-sidedness. The well-rounded course must allow for both factors. Frequently the same series of problems may be made more fruitful by presenting a blank model which the pupil is required to modify. For example, in the making of the paper knife—which a questionnaire shows to be the most popular model in the sixth grade—instead of requiring each pupil to copy one design, a variety of designs might be studied to find out which was most convenient and most serviceable. Sample knives brought from home would add to the general interest. After this study, each pupil might design and make a knife. While there probably would not be any very great variety in their designs, still each pupil would feel his product to be his own, into which he had put himself. This would add, also, to the motive power of the problem—a point in which these two courses are weak.

RECOMMENDATIONS FOR GRADES FIVE AND SIX.

The work of these two grades may profitably include work in paper and cardboard, such as the making of boxes, portfolios, writing pads, etc. Work of this sort offers abundant opportunity for applying and strengthening the pupil's knowledge of number and measurement. It also offers a field for applied design. As far as possible, the pupils should be allowed to plan the articles to meet their individual needs and tastes. This does not mean that they should do as they please and be satisfied with low attainment, but rather that the teacher shall watch for and encourage whatever fruitful ideas are expressed.

Basketry and bookbinding are also types of work well suited to these grades. Some work in these fields is already being done in connection with drawing, and is greatly enjoyed by the children, as shown by their answers to the questions, "What things in handwork have you enjoyed most?" and "What things would you like to make again?"

Pottery is another type of handwork which offers problems well suited to the capacities of pupils of the intermediate and upper grades, and which can be easily adjusted to the conditions of the regular classroom.

It does, however, require a zinc-lined cabinet in which to keep unfinished work, and access to a kiln for firing.

Work in the various materials used throughout the grades should be organized with a view to steady progression from year to year. For example, the making of simple booklets in the lower grades should develop into well-bound books in the upper grades. The informal use of paper and cardboard in the lower grades should develop by easy stages into accurately constructed cardboard work in the fifth, sixth and seventh grades.

GRADES SEVEN AND EIGHT.

In the seventh grade shop work is begun. The course includes a series of formal exercises in joinery, followed by practical application to such projects as a nail box and knife tray. Definite plans are provided for these, and each pupil works to the same dimensions, though each makes a working drawing of his own.

The eighth-grade work includes a series of exercises in wood turning, followed by a series of projects in elementary cabinetmaking, such as footstools, taborets, book racks, etc.

The boys who work in the shop take turns in taking charge of the tool room. This gives excellent practice in systematic care of the tools and a broad acquaintance with a variety of tools and accessories.

RECOMMENDATIONS FOR GRADES SEVEN AND EIGHT.

The emphasis in these courses is placed on accuracy and skill in tool practice, and some excellent pieces of work are turned out. The use of formal exercises at the beginning of the course is open to question, because of their lack of motive power and opportunity for initiative. It is easily possible to select a variety of projects which have a strong appeal to boys of this age and which also embody the fundamental tool processes. These processes may be more effectively taught in the making of such a project than in an exercise which consists only in fitting two scraps of wood together. It is possible to arrange a group of projects for each problem in tool practice, and require that one project in each group be made by each boy. This allows for choice in line with the worker's interest. It also permits varying degrees of difficulty in execution, which may be adjusted to the varying capacities of the members of the class, while orderly and definite progress in the mastery of tools is still maintained. Among the possible projects may be noted jumping standards, hurdles and other playground apparatus, kites, sleds, wagons, camp furniture, bird houses, water wheels and windmills, boxes for specific uses, and other things closely related to the daily needs of the boy. Many boys of this age are anxious to do things which are big and "grown up." In answer to the question, "What would you like to make?" there is a strong vote for tables, bookcases and porch swings. It may often be worth while to make large pieces which involve simple processes only, especially when made for a specific purpose. The making of a pine table of simple construction may be, in its place, as valuable a piece of construction as is the mortised table of oak at a later period.

It is also well to seize upon the chance needs of the school, which offer

an incentive to service as well as practical experience in work which must serve a definite purpose. Tables, shelves and other conveniences for the classroom, looms for the younger children, and similar needs, offer opportunities which justify breaking into the regular course of work for a time. The kits used by the sixth grade would have made an excellent problem, for example, if the need could have been foreseen long enough ahead for the classes to work upon them. Student work is necessarily slow, and the long intervals between lessons increases the time that must be allowed for the completion of a piece of work. A job of this sort, requiring duplicate pieces and accurate workmanship, offers opportunity for acquainting the boys with factory methods of division of labor and the time-saving process of specialization. The aquarium in the Oak Street School, built by the janitor, is another example. If built by the boys it might have given valuable experience in coöperative planning.

A course in handwork should provide, also, for special needs, as in the case of pupils who work more rapidly than the average student. One boy was found working upon one of the beginning exercises, who explained that he had made a table, but as he had completed the course, there seemed to be nothing to do but start at the beginning and repeat it. Ability and industry which enable a boy to complete a course in less than average time should be rewarded and encouraged by advanced work of a particularly interesting type. It is a good time, when his wants are reasonable, to let him make what he "wants to make."

It is suggested that the course be enriched by occasional projects based upon industrial problems of immediate interest, such as the building of miniature machines and mechanical apparatus. Such work, while necessarily crude and imperfect in its details, involves a serious study of fundamental principles and a careful adjustment of parts. For example, the beginners in shopwork in the sixth grade of the Horace Mann School in New York City made water wheels, different boys making different types of wheels. Later they set up a miniature factory with a number of small machines, each made by a small group. When the belts and shafting were all in place, a water wheel was attached and the power turned on. Needless to say, many trials were made and much studying of cause and effect was needed before the small factory was in good running order. Many visits to real factories were made, and all helpful literature studied with deep interest. Among other projects carried out in the same school were the building of a freight station of reinforced concrete, with tracks and cars, and the manufacturing of an electric street car, which was made to travel around a six-foot circle of handmade track by power transmitted through a small handmade dynamo. Work of this type tends to awaken an intelligent interest in the big fundamental principles underlying mechanics and to stimulate a desire to know more and become more skillful. In these points it offers a better preparation for later study and practice in technical processes than much of the more formal work common in school courses. In the one the pupils are generally active, alert, thoughtful and resourceful. In the other they are often passive, waiting for directions, and they lean heavily upon the teacher instead of depending upon themselves. In this newer type of

work the pupil has a problem to solve and must bear much of the responsibility for its solution. It permits individual initiative and supplies a strong motive for work, because the pupil is able to express his own ideas freely and is interested in what he is doing. The older type of work is often formal and mechanical. It is often weak in motive power, and opportunity for individual initiative is almost wholly lacking, because the pupil has only to follow plans and directions prepared by the teacher. The teacher, rather than the pupil, does the thinking.

Whether handwork is to be taught as a means of general culture or with a definite vocational aim, it will fail of its purpose if the thought side is neglected. The mechanic who works with his head as well as his hands is the man who succeeds. Unless the work is so planned that the pupil *must think his way through* a process, much of its cultural value will be lost. Mere ability to construct, under careful supervision, a hammer handle which is worth only a few cents in the market may be a very empty accomplishment. On the other hand, a study of patterns and materials, followed by a choice of the most suitable, and the planning and shaping of the hammer handle to the needs of the person who is to use it, may bring about a brain-stretching which parallels the muscular development to be gained through the mastery of the tools. Whether these more important values are to be secured depends upon the method of teaching even more than upon the choice of subject matter.

It is further suggested that greater use be made of the type of work described as illustrative handwork. Such work is largely the province of the regular teacher, to be used by her when it offers the best means of effectively presenting a topic. Its value depends chiefly upon the extent to which the work becomes to each pupil a real problem in which he feels personal responsibility for the solution.

CHAPTER XIX.

PHYSICAL TRAINING IN THE GRADES.

Walter R. Smith.

THREE kinds of physical training are needed in the grades. The first and most fundamental is play. The second is calisthenic or gymnastic drill. The third is corrective and remedial work. Each of these has its proper place and should be assigned that place in a well-regulated school program.

In regard to the first of these, it may be said that play has always been regarded as the central feature of child life. Our schools long overlooked this primary fact. It was only recently, with the coming of the kindergarten and its influence upon the grades, that the basic principle of child development was given any proper place in the school curriculum. Even yet it makes its way slowly up through the primary grades, gradually losing its hold through the intermediate and advanced grades. And as this fundamental basis of child growth is lost sight of, the work of the school becomes less vital to the child's life, less effective in securing the child's interest and intensive effort, and more irksome to both child and teacher. No child wants to quit the kindergarten, few care to quit the primary grades, but as the child is gradually lost sight of in a logically arranged course of studies which we older people, from our superior heights, try to force down upon him, he loses interest, ceases to strive, and our national records show that at least seven out of eight drop out of our educational mill before they leave the grades.

THEORIES CONCERNING PLAY.

The attitude toward play which leads to our present varied treatment of it may be analyzed into three theories regarding it. The first is that it is dangerous—an unavoidable evil which should be restricted as far as possible. The second is that it is natural, harmless and useless, and that the child does not need training for it. The third is that it is a fundamental means of training for life, and hence it is the proper point of departure for all education. The first is puritanism and has been discarded; the second dominates the public mind and the traditional school; and the third has made the kindergarten, now rules the primary grades, and is rapidly revolutionizing the work of the upper grades.

This broader view of play as the dominant characteristic of the child calls for serious treatment of it in every phase of school work. He takes play seriously, and if we take him seriously we must do the same. Every movement in dealing with the child must be from his central interest outwards. We must build upon what he is, not upon what we hope he is to become. We have learned this in teaching him the abstract subjects of reading, writing and numbers; but, strangely, after discarding the purely disciplinary idea elsewhere, we have clung to it in physical training, which is the most concrete and natural field

for avoiding it. Play should be made the solid foundation upon which to build all physical education; but it is not generally so well founded in our public schools, nor, as we shall see, is it in Leavenworth.

GYMNASTICS.

The second kind of physical training to be expected is calisthenic or gymnastic drill. For this the body is divided up into sections and scientifically analyzed. A logical series of exercises is prescribed, which, if gone through with, guarantee the exercise of all parts of the body. Coördinated movements are arranged for and enforced by drill. These coördinations start in simple movements and grow complex as the pupil progresses. They call for concentrated attention, obedience, correct posture, and abundant and varied muscular and organic exercise. Used in proper proportion, and well taught, calisthenics form a valuable adjunct to play in physical culture. But there is constant danger of the drill becoming mere drudgery, in which case the educational value largely disappears. Motives appealing to the child, and a moderate amount of initiative, must be obtained to keep the set exercises educative.

CORRECTIVE PHYSICAL TRAINING.

The third type of physical training needed is remedial and corrective. Physical defects and constitutional weaknesses are generally enhanced by neglect. We prefer to exercise our strong muscles, organs and aptitudes to the neglect of the weaker ones. This may intensify the native weakness. To prevent such specialization, corrective work should begin while the pupil is young. Calisthenics and gymnastics, by exercising the whole human mechanism, are partly remedial, but they are not sufficient. The full purpose and value of physical-training work can not be realized until supervisors are able to give physical examinations and prescribe corrective work. Such examinations and prescriptions are frequently given in collegiate work. They are more needed in earlier years, but probably it is too much to expect of public schools that they do scientific corrective work at present. But physical training should look ever toward it as an ideal.

We are now ready to apply these three tests—play, calisthenics, and corrective gymnastics—to the physical-training work of the Leavenworth Public Schools. By them it is to be measured, not judged.

THE COURSE OF STUDY.

A careful analysis of the outline of work in physical training shows much that is commendable, but to harmonize it with the ideas previously advanced it needs revision at three points. Since these weaknesses, as the writer considers them, are quite general over the country, and are not eliminated in Leavenworth practice, they need to be pointed out.

The first one is in the idea embodied in the use of the term "physical development." We have given up the term "intellectual development" as synonymous with education. It expresses only one phase of the broad significance now attached to the educational process. But physical training is new in our schools, and the old, narrow conception dominates the public mind regarding it. "Physical development" indicates that a sound

body is all that is to be striven for in physical education. A strong and healthy body is eminently worth while; but true physical education means far more. It means the utilization of the youthful love of physical activity for education in its broader aspects. If we are to build our school program upon the child as he is—and all our present educational theories demand that we do—then wide use must be made of his love of play and exercise. Physical training reacts so intimately and powerfully upon mental and moral training that mere physical development should be only one feature of it. An adequate conception of the value of play is shown in the statement of the course of study for the primary grades, but this conception should be specifically dealt with when outlining physical education.

The second feature of the outline needing revision is the "aims" of physical education. In the six aims stated in the course of study there is no hint of social or moral values to be obtained. They are previously pointed out with reference to the primary grades, however. Health, growth, order and exactness, alertness and quick reaction, endurance, are to be developed. Nothing is said about coöperation and fellowship, which can be more easily stimulated in team games than anywhere else in life. No mention is made of the primary ideals of loyalty, love or fair play, chivalry in victory and cheerfulness in defeat, which are the natural outgrowth of a properly used playground. Nor is there any mention of obedience or self-control—the largest educational returns from gymnastic drill.

The third revision needed is in the emphasis placed upon gymnastic drill. This might seem to be justified by the lack of playgrounds about the school buildings. But a closer analysis shows that to be one of the very reasons for shifting the emphasis. Most of our national and inherited games call for a large amount of space. When this can not be had there is all the more reason for teaching games that can be used on small playgrounds and which call for the same coördinations, the same ingenuity and dexterity, the same mental, moral and physical powers demanded by the regulation games American children are in the habit of playing. Baseball, football, basket ball, dare base, running, leaping and throwing games, call for space. And, since this is not to be had in Leavenworth at present, children should be taught other games which produce the same development that makes the above-mentioned games so valuable. Indoor baseball, volley ball, tether ball, basket ball and a large number of similar games now being taught in physical-training schools meet these demands.

So the excuse generally offered by school authorities for placing most of the stress on calisthenics can not justify it. Simple gymnastic drill ten minutes a day is merely scratching the surface of a rich field of usefulness. The school yard is properly mentioned in the course of study as the preferred place for these exercises, but the brevity of a ten-minute period might easily lead to the use of study rooms or corridors in place of the yard. The course of study might profitably be revised, much enlarged in scope and suggestion, and means of correlation with other phases of teaching work pointed out. This can easily be done without

sacrificing any of the idea of health and physical development. In fact, the effectiveness of physical training in promoting health and longevity depends to a large extent upon its harmonious adjustment to other phases of school work and the life that is to follow.

FACILITIES IN LEAVENWORTH.

Leavenworth has a well-trained and efficient part-time supervisor of physical training. Each room is met at least every two weeks. Several classes in calisthenics were observed. Some were directed by the regular teachers and some by the supervisor. Also a full list of the exercises prescribed for the current year from its beginning until April 1, including all the grades from one to eight, were examined. A typical one, to be practiced ten minutes a day for two weeks, follows:

PHYSICAL DEVELOPMENT.

GRADE 7.—DUMB-BELLS. LESSON 6.

1. HOPPING: Hop on the ball of left foot 8 times while making a complete turn to the left, quickly change on the right and turn right about, each in 8 counts.
2. Raise arms forward and lower (1-2). Same sideward and lower (3-4).
3. Raise heels and bells on shoulders and return (1-2). Dip left sideward and raise arms to the left sideward and return (3-4).
4. March forward 4 steps (1-4). Face left in 4 steps (5-8). Bells on shoulders (9). Straighten upward (10), on shoulders (11). Lower arms (12). Repeat arm exercise (13-16). Do 4 times.
5. Bells on hips (place). Lower trunk forward and straighten arms sideward and return (1-2). Elevate chest and straighten arms upward and return (3-4).
6. Point step and raise arms forward (1). Raise left knee and move arms sideward (2). Return movement (3-4). Same right (1-4).
7. Stride left sideward and bells on hips (1). Bend left knee trunk left and straighten arms upward (2). Return movement (3-4). Same to the right (1-4).

GAME.—Toss Chase Ball. Form a large front circle, standing close together. Medicine or basket ball may be used. A pupil stands in the center. Some one in the circle will have a ball, who will toss it to some one else. While this is done the one in the center will try and touch the ball; if so, those two will change places, etc.

Many of the exercises prescribed were quite properly without apparatus. Some were without the game at the end. The apparatus at hand consisted mainly of dumb-bells, Indian clubs, and wands. The games were generally very simple ones, not calling for thought or special ingenuity, and were evidently given to produce an exhilarating finish to the less interesting drill. Simple games would be necessary if put at the end of a brief ten-minute period. No suggestion of alternating the game and calisthenics was observed, and the evidence indicated that the game was not featured as educational; nor was it given at all with any degree of regularity, as the writer found when he wanted to see one.

THE VALUE OF PHYSICAL DRILL.

The value of a certain amount of physical drill is not to be questioned, however, if taken under educational conditions. It is intensity of effort that develops. But it may well be doubted whether calisthenics as an end, given to the count of 1, 2, 3, 4, 1, 2, 3, 4, without any motive, can produce intensity of effort, either mental, moral or physical. Yet drill, as a means to an end, can be made intensive, as shown by the annual field meets. They are given the last of April and provide an excellent temporary

motive. Competitive drills or public exhibitions have the same effect. But the pupil's interest in the perfection of the coördinations called for must be present to make the drill educative, and that is impossible while using calisthenics as the sole means, or health or rounded development as an end. The pupil, as pointed out by Dr. Frank A. McMurray, is not bothering about his health; "he would be in an unhealthy state of mind if he were." He is not willing to put forth much effort for the purpose of obtaining a sound mind in a sound body. Activity, life, struggle, he loves. But the end must be in view, even as with an older person. Calisthenics are useful in proportion as they can be organized so that the pupil may have a present motive or purpose, be allowed some decision and initiative, and work at all times with some desirable end definitely in view. This means that instead of being the foundation of physical education, gymnastic drill should be merely one of the pillars supporting the superstructure.

CHANGES NEEDED.

If the physical training offered in our schools—and the Leavenworth schools are typical in this respect—is to fulfill its highest purpose, three things need to be done. First, the periods should be lengthened. If time is at such a premium the periods might be put farther apart. It is stated in the course of study that this work is not to take the place of recesses, and it can not. So enough time should be taken each period to teach something worth while. Other recitation periods, even for the minor studies, are at least double the length of the period of gymnastics. And yet, if physical training is well done, who would maintain that it is of less importance than other studies of the curriculum? Lengthening the period, then, is the first essential of a more effective physical-education program.

The second essential is that special rooms must be provided where the extra noise of this work will not interfere with other rooms, and where there is sufficient free space for marching, dancing and the more complex games. Fortunately, this can be done in several of the buildings, and is being planned for in the repairs to be made during the coming summer. The Staff are united in the belief that this is one of the prime essentials calling for the careful attention of the architect, the board, and the supervising force of the schools. Little of the work really needed can be done with the present unsatisfactory provisions and equipment.

The third essential is a revision of the emphasis placed upon the relative values of the work offered as physical training. The play element must receive much more attention. Routine drill is merely the a-b ab, e-b eb of physical education. It has the same relation to physical culture that spelling drill has to reading, number drill to arithmetic, and date drill to history. Swinging an Indian club has little more educational value than swinging an ax or a hoe. The whole set of light-apparatus drill provides little more physical training than "doing the chores," and much less moral value. What is needed is stimulus and heroic effort.

Compare them for a moment with the game of basket ball. Basket ball calls for speed, agility, manual dexterity, endurance, deep breathing, all sorts of coördinations and accuracy, and the exercise of every part of

the body. On the mental side it demands initiative, quick thinking, judgment, decision, and the varied technique of team work. On the moral side it requires control of the temper, fairness to opponents, coöperation with associates, and self-sacrifice for the good of the team. Every physical, mental, and moral power is exercised intensively, educatively, and the pupil is trained in the sort of reactions called for in the social, political and business world.

What is true of basket ball is true of other highly organized team games. But it may be said that this is too strenuous for a large number of pupils, especially the girls. Does not every teacher plead for intensive work along his line? Do not all boys and girls love strenuous work? Is not that the way they play on the playgrounds? Moreover, all do not need to play all the games. One of the great purposes of a supervisor is to see that they do not. Pupils may be graded in their games, as in other parts of the curriculum, according to their needs and abilities.

Games, however, are not all. Folk dancing and other emotionally expressive physical exercises have all the cultural value attributed above to team games. They call for varied mental and moral as well as physical exercises. Intensive effort is obtainable. Motive, organization, initiative and physical self-control are all provided for. They are truly educative, and gymnastic drill can be only when founded upon the same child interest and calling for the same varied efforts present in the game and the folk dance.

CORRELATION WITH OTHER STUDIES.

Still another feature, already developed to some extent in the Leavenworth schools, should be emphasized. Physical training should be correlated with other phases of school work. A nature-study trip into the country is excellent physical training. They are suggested in the course of study for grades 1, 2 and 3, but are as valuable later in the course. A walking trip to a track meet or baseball game or to the golf links, with explanations to pupils, is likewise educative. These stimulate an interest in physical training and health-giving exercises that will be carried into real life. Above all, the physical-training work should be linked up with playground supervision. What is taught in the classroom should function on the playground at recess time. The games should there be practiced under pupil initiative and control. Contests of various kinds, demanding all sorts of qualities, and graded according to size and strength and ingenuity, should be encouraged. School athletics and physical training should also be linked with the summer playground work recommended elsewhere.

One of the interesting observations in Leavenworth was that two of the three large schools have almost no playgrounds. They are built upon city lots with just a few feet of space to the sidewalks. In each of these buildings the observer found a strong effort to cultivate the recess period. The grounds were well supervised, the teachers played with the children at times, and seemed to feel the same responsibility for the educational use of this time as of the other school time. With heavy handicaps, much was being done. The third of these larger buildings has ample playgrounds, being built near the center of a

whole block. This school was having no recesses at all at the time the survey was being made. This was doubtless temporary, but it indicated too little attempt to make use of the play instinct of the child in his education.

Moreover, the patronage of this school is mainly of the middle and poorer classes, where the houses are small, lawns wanting, play space cramped, and home conditions frequently unfavorable. All these together form a basis for the most effective use of play and other forms of physical training. School spirit and loyalty could be built up around the playground. The lack of brightness and cheer in many of the homes could be partly counteracted in the school. Many a boy and girl could thus be saved from dropping out of school and from going out into the life of Leavenworth unprepared to spend his leisure time in clean recreations or his work time in remunerative employment. Jacob A. Riis has truly said that "the boy without a playground is father to the man without a job."

FORMING THE HABIT OF PLAY.

While questioning the value of the emphasis placed upon drill in the physical-training work in Leavenworth, the writer is glad to point out that what is attempted is well done. The drills observed were more than perfunctory. The pupils were developing some valuable coördinations and couple movements. But it is a little hard to imagine them following up these activities in after life. Gymnastic drill, if indulged in in later years, remains a conscious effort, while games stimulate an unfailing interest that brightens life, even though they be discarded as a means of recreation. But they will not all be discarded if the habit of play is developed during youth. The mad rush of American life needs to be checked by wholesome recreation. Our athletic revival during the past two decades has already done much to relieve the strain and nervousness of our people. Its further extension into the elementary schools will do much to give to all of our public-school children much of the valuable training now obtained by higher-class Englishmen. Concerning their training Doctor Curtis says:

> "One of the best things about the system of physical education in the typical English preparatory and public school is that the students are supposed to get out and play every afternoon, as soon as their lessons are over. These exercises are practically required up to the sixth form in the public school, and by that time the habit has been so well established that the student continues to play during his university course and probably during the rest of his life, from the force of this early custom."

PLAY AS A PREVENTIVE OF DISORDER.

One other point remains to be mentioned. It was pointed out in the analysis of Leavenworth that organized amusements were lacking. The gaming spirit, which is perfectly natural and highly useful, must be properly directed or it will find an outlet in illegitimate channels. One's taste in games should be cultivated as carefully as his taste in literature. One's recreations should be as clean as his business transactions. McMurray well says: "Physical training should develop an interest in play, a knowledge of games, and a skill in them, that will

permanently identify one with healthy sport, just as literature should develop a taste for reading and nature study a permanent enjoyment of plants and animals."

If Leavenworth or any other city is to close up evil resorts of all kinds there is no better way to go about it than to provide legitimate amusements to undermine them. If they are to be eliminated in the future, a generation of citizens must be trained up who know how to amuse themselves in a better way. If proper athletic and play interest are stimulated in the schools, the future city will not be without golf links, baseball parks, public tennis courts, supervised playgrounds, and the varied paraphernalia necessary to provide healthful physical recreation as a preventive of disorder, vice, stagnation, and sentimentalism. No better moral and governmental and business investment can be made by Leavenworth than that in additional play stimulus and facilities. And the best place to begin, in order to get far-reaching effects, is in the elementary schools.

CHAPTER XX.

READING AND LITERATURE.

Minnie E. Porter.

No ATTEMPT was made in this Survey to determine the reading rate of the pupils. The test which Mr. Courtis has recently offered would be an interesting and valuable problem of study for the teachers. It is recognized that the value of reading as a tool is largely dependent upon the rate of reading as well as upon the ability to understand what is read.

THE COURSE OF STUDY.

The program for the teaching of reading provides for the use of the state textbooks, Studies in Reading, by Searson and Martin. The Fourth Reader is used in grade four and the Fifth Reader in grade five. As no textbook is prescribed for grades six, seven and eight, the superintendent and teachers are free to select literature suitable for reading in these grades. In their choice they have recognized the sources of interest in the reading of pupils of this age. We find such selections as "The Pied Piper of Hamelin" and "Rip Van Winkle" in grade six; "Miles Standish," Cooper's "Tales" and the "Oregon Trail" in grade seven; "Evangeline," "The Lady of the Lake" and "Julius Cæsar" in grade eight.

The use of supplementary readers in the schools of Kansas is prohibited by state law. As a result of what is assumed to be an effort to safeguard the interests of the people of the state, a serious limitation has been placed upon the education of boys and girls in Leavenworth. The school authorities of Leavenworth have made a commendable effort to overcome this limitation upon the reading of boys and girls by establishing a circulating library, for which they are making liberal provisions. They are in sets of thirty volumes, each set in a box. These acts are kept at the office and sent out to teachers upon application.

GRADE IV.

Story of Holmes. Literature.
Story of La Salle. History.
Story of Longfellow. Literature.
De Soto. History.
Marquette. History.
Story of Boone. History.
Pioneers of the West. History.
Fremont and Carson. History.
Stories and Rhymes of Woodland. I. Literature and Science.
Stories and Rhymes of Woodland. II. Literature and Science.
Story of Coal. Science.
Story of Wheat. Science.
Story of Cotton. Science.
Story of Printing. Science.
American Inventors. (Whitney and Fulton.) Science. I.
American Inventors. (Morse and Edison.) Science. II.
Night Before Christmas, and Other Christmas Poems. Literature.

GRADE V.

The Miraculous Pitcher. Literature. *Hawthorne.*
Audubon. Science.
Nathan Hale. History.
Story of Sugar. Science.
What We Drink. Science.
Story of Canada. History.
Story of Mexico. History.
Story of Steam. Science.
Story of the Flag. History.
Stories from Robin Hood. Literature.

GRADE VI.

King of the Golden River. Literature.
Rab and His Friends. Literature.
We are Seven, and Other Poems. Literature.
Lady of the Lake. Conto I. Literature.
Declaration of Independence. History.
Thanatopsis, and Other Poems. Literature.
Snow Image. Literature.
Gifts of the Forest. (Rubber, Chincona, Resin.) Science.
Great European Cities. (London and Paris.) Geography.
Great European Cities. (Rome and Berlin.) Geography.
Great European Cities. (St. Petersburg and Constantinople.) Geography.
Heroes of the Revolution. History.
Lewis and Clark Expedition. History.

GRADE VII.

Story of Macbeth. Literature.
Philip of Pokanoket. Literature. *Irving.*
Lady of the Lake. Canto II. Literature. *Scott.*
Snow-bound. Literature. *Whittier.*
The Gray Champion. Literature. *Hawthorne.*
The Oregon Trail. History. *Parkman.*

GRADE VIII.

The Deserted Village. Literature. *Goldsmith.*
As You Like It. Literature. *Shakespeare.*
Lady of the Lake. Literature. *Scott.*
Canto III.
Canto IV.
Canto V.
Canto VI.
The Cotter's Saturday Night. Literature. *Burns.*
Lay of the Last Minstrel. Literature. *Scott.*
Building of the Ship, and Other Poems. Literature. *Longfellow.*

THE TEACHING OF READING.

For constructive recommendations for the teaching of reading in Leavenworth, illustrations have been found for each point in exceptionally good work seen during observation in the classrooms. It is recommended that in the organization of departmental meetings the significant points of merit in the work of teachers may be made helpful to all in this line of work.

There are two points of commendation for the teachers of reading in Leavenworth. The teachers have done their work carefully and thoroughly in teaching the mechanics of reading. By means of an articulation chart, careful drill is given in enunciation. The pupils read clearly and distinctly. The second point of commendation is that the pupils read with

understanding. The teachers are careful to make sure that reading for information yields the desired result. The library reading provided furnishes opportunity to use the reading hour for this purpose.

But in a third point so necessary to the interpretation of real literature, imaginative or creative reading, the teachers are not generally so successful. In some cases they fail to distinguish between reading for information and reading for the sake of entering through imagination the delights of literature. As a consequence, questions asked by the teacher call for information rather than the result of creative imagination. For example, in the reading of "The Pied Piper of Hamelin," if the teacher asks such a question as, "What did the Piper do next?" she would receive the answer, "He led the children down to the sea." This is information plainly given in the poem and has nothing to do with interpretation. On the other hand, if the teacher asks such a question as, "What did the children do under the hill?" this would call for the results of creative imagination, and the children would be only too happy if the imagination were given free play. The writer observed a lesson on "The Pied Piper of Hamelin" in which the children had entered wholly into the experience of those German children who followed the Piper. The writer felt this so strongly in her observation that she put in quickly the question, "How many of you would have followed the Piper?" and received an affirmative response at once from all the boys and girls in the class except three sedate little girls, upon whom the others in the class looked with some pity.

A lesson was observed in grade five in which the teacher had followed the suggestion, "Getting into the atmosphere of the piece." The lesson was the preparation for and the reading of the poem, "The Use of Flowers," in Lessons in English, by Scott-Southworth, page 144. In the word study the teacher did not deal with the dictionary definitions. She talked with the children freely about luxuries until they brought out of their experience those things which were luxuries to them. They translated the word comfort in terms of actual life. The teacher talked with them about the things necessary for their outward life, and brought these into contrast with those things which delight and comfort people, as flowers do. When the children opened their books to read the poem for the first time, they brought to that poem a fresh understanding of those things within their own experience which made the reading of the poem creative. After reading silently the poem, which contained these lines:

"To comfort man, to whisper hope,
Whene'er his faith is dim";

the teacher asked if any one could tell what flowers do for the inner life. She was rewarded by the shining eyes of a little fellow who replied, "Flowers hope up man." This lesson had succeeded.

THE OUTSIDE READING OF PUPILS.

The schools, in teaching pupils to read, have given to boys and girls in their early teens a power to extend their life experience, which at this age is demanding a wider field of adventure. Through the identification of self with the hero or heroine of fiction, these young people are growing

rapidly in their ideals of manhood and womanhood. Later life furnishes the opportunity to give expression to these ideals in a world of action. Just what influences are most powerful in the early teens may be discovered in books which are most widely read. It is this world of the imagination that is making a marked contribution to the moral development. Franklin K. Mathiews, Chief Scout Librarian of the Boy Scouts of America, writes of "Your Boy and His Books" as follows:

> Find the stories in which the heroes have the characteristics the boy so much admires—men of unquenchable courage, immense resourcefulness, absolute fidelity, conspicuous greatness; the men who do things, big things, wonderful things; the men who conquer and overcome in the face of the heaviest odds, who "never turn their backs, but march breast forward, to do or die." For the boy, that spirit is the stuff of which great manhood is made; and if with books we would profoundly influence him, we must constantly challenge him with stories of astonishing accomplishments, biographies that hold him spellbound, wonder tales of almost unattainable undertakings achieved.

As an attempt to study this problem in Leavenworth, one question, "What books have you read during the past year?" was placed in the pupil *questionnaire* used in the Survey. The data collected and classified for this report, with the assistance of the school department librarian at the Kansas State Normal, will be suggestive.

In the tabulation the books have been arranged in the order of the number who expressed preferences for them. In another column appears a classification of the quality of each book, ranking A, B, C, or D. Books marked A are of first quality in the list, for one of two reasons—literary merit or high grade of subject matter. Those marked B are ranked lower in literary merit, but are considered good reading. Books marked C are those which serve to bridge over the reading of pupils who have not developed a taste for reading which is satisfied by those in A and B. Books marked D are books which are recognized as being harmful, although often very popular. Their success depends upon the elements of adventure which appeal to boys, and to a weak, self-centered heroine who sometimes appeals to girls of this age. The Rover Boys, Motor Boys, Alger Books, and Elsie Books are the conspicuous examples of this type of juvenile fiction.

The tabulation of data collected is submitted as follows:

No.	*Title.*	*Rank.*
59	Rover Boys	D
55	Alger Books	D
39	Motor Boys	D
29	Alcott Books	A
29	Dorothy Dainty	D
26	Shakespeare's Plays	A
22	Dave Porter Books	D
21	Little Colonel Books	C
20	Lang's Fairy Tales	B
16	Boy Scout Books	D
16	Uncle Tom's Cabin	A
15	Snow-bound	A
10	Five Little Pepper Books	B
9	Black Beauty	B
9	Evangeline	A
9	Helen Grant Books	D
9	Lady of the Lake	A
9	Robinson Crusoe	A

No.	*Title.*	*Rank.*
8	Ben Hur	A
8	Jack Books	B
8	Patty Fairfield Books	C
7	Lake Port Series	D
7	Pollyanna	D
7	Rip Van Winkle	A
7	Treasure Island	A
6	Beautiful Joe	B
6	Courtship of Miles Standish	A
6	Prudy Books	D
5	Betty Wales Books	C
5	Life of William Cody	—
5	Oregon Trail	B
5	Story of Lincoln	B
5	Tom Sawyer	A
4	Bible	A
4	David Copperfield	C
4	Dotty Dimple Books	D

No.	Title.	Rank.
4	Girl of the Limberlost	C
4	Last of the Mohicans	A
4	Legend of Sleepy Hollow	A
4	Little Shepherd of Kingdom Come	A
4	Only an Irish Boy	D
4	Perfect Tribute	A
4	Quest of the Four	B
3	Andrew's Great Pluck	D
3	Custer on the Plains	C
3	Dutch Twins	A
3	Freckles	B
3	Gifts of the Forest	A
3	Helen's Babies	B
3	Hoosier School Boy	A
3	Ivanhoe	A
3	Kit Carson Books	—
3	Nathan Hale	A
3	Pilgrim's Progress	A
3	Poe's Poems	A
3	Rondy Books	D
3	Sinking of the Titanic	—
3	Story of Canada	A
3	Stratemeyer Series	D
3	We are Seven	A
3	Wild West	—
3	With Washington Out West	—
3	Young Trailers	B
2	American Boys' Handy Book	A
2	Anne Green Gables	A
2	Aunt Jane's Nieces	D
2	Battling Nelson's Career	D
2	Billy Whiskers	D
2	Boat Club Boys	D
2	Boy Fortune Hunters	D
2	Carpenter's Readers	A
2	Christmas Carol	A
2	Dickens' Works	A
2	Elsie Dinsmore Books	D
2	Flying Girls	D
2	Girls of the Forest	D
2	Gray's Elegy	A
2	Great Stone Face	A
2	Hard Working Girls	D
2	John Halifax, Gentleman	A
2	Juan and Juanita	B
2	King of the Golden River	A
2	Life of Washington	A
2	Mrs. Wiggs of the Cabbage Patch	A
2	Old Rose and Silver	D
2	On the School Team	B
2	Peck's Bad Boy	D
2	Peggy Owen Series	D
2	Rab and His Friends	A
2	Rebecca of Sunnybrook Farm	A
2	Story of Carson and Fremont	A
2	Story of Mexico	A
2	Sweet Girl Graduate	D
2	Swiss Family Robinson	A
2	Trail of the Lonesome Pine	A

In this tabulation only those books that were mentioned more than once were considered. A study of the number of times each book is named in the list shows that 44 per cent, or nearly half, of the reading done by the pupils in grades six, seven and eight is of the class marked D. In this class are found the Rover Boys, Alger Books, Motor Boys, and Boy Scout Books, widely read in Leavenworth. No comparative data are at hand to show the results in other cities, because these books are not included in library reports. But since book dealers find them commercially profitable when offered for sale, without consideration of the welfare of the boys of the city, we may be led to believe that in cities and towns where these books are sold the records would be similar.

The libraries of the city, both public and Sunday-school libraries, share with the schools and the homes the responsibility for intelligent direction in the matter of reading. As stated before, the public library is doing active work in coöperation with the schools. On their shelves are some books of class D which the librarian has retained temporarily that boys and girls may find the books they ask for, and thus give him an opportunity to bridge them over to something better later on. In one large Sunday-school library are found the Rover Boys, Motor Boys, Alger, and Elsie Books, which are being supplied to the children. They have, no doubt, been selected on the recommendation that they are the books which boys and girls like best, without consideration of the influence which they have upon character formation.

Since it is believed that the books which boys and girls are reading are influencing them, and since almost one-half of the reading done by the boys and girls in Leavenworth in grades six, seven and eight is of a character which identifies the youthful reader with ideals that are false to the best in American manhood and womanhood, the home reading of boys and girls must be a matter of serious consideration to all who are interested in the welfare of the young people of the city.

CHAPTER XXI.

SPELLING.

Walter S. Monroe.

THE TEACHING OF SPELLING.

SPELLING is taught systematically in all grades, and 7.9 per cent of the total time of the teachers if given to the subject. See page 59. The work in grades five to eight is based primarily upon a printed list which has been prepared by the superintendent and the teachers. In this list they have attempted to place the words which make up the speaking and writing vocabulary of pupils in the respective grades. In addition, the teachers are urged to keep, and do keep, lists of misspelled words, which are used for occasional lessons.

THE SPELLING ABILITY.

The spelling ability of the pupils was measured by giving a test to all pupils in grades three to eight, inclusive. This test was given in Leavenworth simply as an exercise in dictation, the pupils not knowing that they were to be marked for spelling. The directions and test are given below.*

DIRECTIONS FOR GIVING SPELLING TEST.

Please read these instructions through before beginning to dictate the sentences:

1. See that *each sheet* is headed with (*a*) the pupil's name; (*b*) his age; (*c*) number of years he has been in school; (*d*) the grade; (*e*) the date; (*f*) the name of the school.

2. Dictate all the sentences to all the grades, beginning with the third, during one session; *i. e.*, all either in the morning or the afternoon of the same day.

3. In third and fourth grades dictate in two periods, separated by a day.

4. Each sentence may be dictated, either in whole or in part, as many times as may seem necessary to secure its complete understanding. This exercise is purely a test in spelling; it is not intended that pupils should be subjected to the added difficulty of an effort to recall the words dictated.

5. Offer no explanation of words or sentences. If the meaning is not clear, repeat the sentence in whole or in part.

6. Do not ask the children to underline words, or otherwise call their attention to the significant words of the sentences. Where possible so to conduct the matter, the pupils are not to know that it is a spelling test. To them it is but a dictation exercise.

7. After the children have written the sentences, read them all through again and allow pupils to insert words or make other corrections.

8. Don't hurry; but keep things going fast enough so that pupils will not have time to examine into what their neighbors are doing, or to give help to each other.

9. When third and fourth grades have written half the list, take up the papers and hold them until the second dictation. Then give them out again for the pupils to finish.

10. Collect the papers as soon as the work is finished.

SPELLING TEST.

If the *janitor* sweeps, he will *raise* a dust. Wait *until* the *hour* for *recess* to *touch* the *button*. *Whose answer* is *ninety? Smoke* was *coming* out of *their chimney*. *Every afternoon* the *butcher* gave the dog a *piece* of meat. One *evening* a *carriage* was *stopping* in front of my *kitchen*. I *wear* a number *thirteen collar*. *Guess* what made me *sneeze*. Send me a *pair* of *leather* shoes. I do not *know*, but I am *almost sure* they are mine. My *uncle bought* my *cousin* a *pretty watch* for *forty dollars*. The *soldier dropped* his *sword*.

* The directions, test, and comparative data were furnished by Dr. J. F. Bobbitt.

Jack had a *whistle* and also *twelve nails*. The *ocean* does not *often freeze*. You *should speak* to *people* whom you meet. It takes only a *minute* to pass *through* the gate and *across* the *road*. Did you ever *hear* a *fairy laugh*? The *American Indian* had a *saucer without* a cup. *Neither* a *pear nor* a *peach* was at the *grocery* store to-day. Cut up a *whole onion* with a *handful* of beans. My *piano lesson* was *easy*. The *animal* ran *into* the road and *straight against* a tree. I *believe true friends* like to be *together instead* of apart. *Telephone* me on *Tuesday* if the *tobacco* comes. The *tailor* sent a *saucy telegram*. *Already* the *circus* was *beginning*. *Pigeons* seem *too beautiful* to *quarrel*. I am *trying* to *choose* a *towel*. The *chicken* was fried in *grease*.

(*Adapted from Buckingham: Spelling Ability.*)

In marking the papers, only the one hundred words in italics were considered. Mistakes in the spelling of other words were not counted or noticed in any way.

TABLE XXXII.

The Median Spelling Scores by Grades.

Grade	*III.*	*IV.*	*V.*	*VI.*	*VII.*	*VIII.*
Average for 40 schools	36	58	72	82	88	92
General average for Leavenworth	37.5	59	69.4	77.1	81	85.6
Morris	38	51	65	72	79	85
Oak Street	18	65	59	77	83	89
Third Avenue	54	55	70	76	81	83
Lincoln	28	33	64	82	78	76
Sumner	57	63	76	80	84	95
Franklin	24	64	70	73	..	..
Maplewood	36	60	52	65	..	..
Wilson	38	61	93	92	..	..
Jefferson	36	72	..	..	..	..
Cleveland	46	65	76	..	..	..

Dr. W. Franklin Jones* has given us the writing vocabularies of 1050 children classified by grades. Of the hundred words which make up this test, 74 appear in the writing vocabulary of the second grade, 13 in that of the third grade, 7 in that of the fourth, 1 in that of the sixth, and only 4 words (janitor, stopping, American, and lessson) are not included in the writing vocabulary of any grade.

A comparison of the scores for the schools of Leavenworth with the average shows that Leavenworth is below the average in most cases. The median score of 18 for the third grade in the Oak Street School is no doubt due to the fact that they took only half of the test.

These scores indicated that spelling is rather exceptionally well taught in the Sumner School and in certain grades in other schools. as, for example, the fourth grade in the Oak Street School, the third grade in the Third Avenue School. The upper grades make a relatively poorer showing. This probably is because sufficient drill is not given upon spelling in these grades. In fact, in the work observed by the writer, little attention was given to drill, and the emphasis was placed upon the meaning of the words and the ability to use them in sentences.

In view of the generous time provision for the teaching of spelling and the instructions of the superintendent, together with the nature of the spelling lists which are used, one would expect to find the children of Leavenworth exhibiting superior spelling ability. But the results of this test indicate that sufficient drill upon spelling is not provided.

* W. Franklin Jones, Concrete Investigation of the Material of English Spelling. University of South Dakota.

CHAPTER XXII.

THE HIGH SCHOOL.

Walter S. Monroe, assisted by the Staff.

THE NEW FUNCTION OF THE HIGH SCHOOL.

THERE are certain facts which show that the public high school is coming to fulfill a new function in our social order. The following statement is quoted from Bulletin No. 29 (1913), United States Bureau of Education: "From 1890-'91 to 1900-1901 the number of secondary schools, both private and public, rose from 4,885 schools, with 309,996 students, to 8,210 schools, with 649,951 students; by 1910-'11 these figures had increased to 12,213 schools, with 1,246,827 students. The schools belong to many types, ranging from those with only the strictly classical curriculum to those which are essentially vocational high schools organized with little or no reference to higher education." The fact that within the period from 1890 to 1910 the population of the United States increased only 41 per cent, and that within the same period the number of secondary schools increased 150 per cent and the number of students 260 per cent, is very significant. It indicates that the public high school, which is the dominant type of secondary school, is coming to fulfill a much larger function in our plan of education.

A study of the enrollment of the Leavenworth High School points to the same conclusion for the city of Leavenworth. (See page 42.) From 1881, when the enrollment reached 200, until 1905-'06 it did not pass the 300 mark; but within ten years the enrollment has doubled, and the indications are for a continued increase. Within this same period the population of Leavenworth has remained practically stationary. This means that the Leavenworth High School is assuming new relations to the community.

THE REORGANIZATION OF SECONDARY EDUCATION.

There are two distinct lines along which the reorganization of secondary education is taking place. First, new subjects are being added to the program of studies. For example, domestic science and agriculture are being introduced in many schools. In the program of studies of the Colebrook Academy we find such subjects as political economy, history of commerce, advanced physiology and hygiene and the elements of nursing, horticulture, agronomy, and farm mechanics and carpentry. Second, there is a reconstruction of the subject matter within the present high-school subjects. Such subjects as algebra, geometry, physics, chemistry and botany had their beginnings in some practical needs, and have been elaborated by men who became interested in the subject matter for its own sake and who thus lost sight of its relation with practical life. This elaboration and the subsequent organization have resulted in structures which are marvelous when judged with respect to completeness and logical order, but which are composed of the subject matter far removed from the

realities of life and organized according to the working of the minds of mature philosophers and logicians rather than the minds of children.

The point of view which is being adopted in the reconstruction of our present high-school subjects is to ask regarding each topic, each problem, each process, each fact, the question, "*What is this used for in the world outside of the schoolroom?*" If subject matter will not assist in the preparation which the boys and girls need for the varied activities in which they will participate as adults, it is being eliminated from the subject. To what is left of the present high-school subjects after this elimination other subject matter is added which is useful in preparing boys and girls for the activities which they must undertake. After this is done, the whole is being organized in accord with the working of the child's mind rather than that of the adult.

This general point of view is being accepted by many of our foremost educators, and it seems quite certain that a number of our present high-school subjects will be reconstructed according to this plan. In the following sections of this Survey some detailed suggestions are given for the reconstruction of certain subjects in the Leavenworth High School. It should, perhaps, be stated here that these suggestions are not mere theories held by the members of the Survey Staff, but are ideas which have been given sufficient trial to warrant recommending them to the principal and teachers of the Leavenworth High School.

The Leavenworth High School is rapidly coming to occupy a different place in the community, and in order that it may efficiently fulfill this changed function, the principal and teachers of the High School face and will continue to face the problem of working out a reconstructed curriculum.

RECOMMENDATIONS.

The regular faculty meetings can be very effective if they are utilized for the serious study and consideration of vital educational problems. The working out of plans for correlation of the work of two or more departments returns rich profits in the effect upon the teachers. A small amount of this is now being done. It will be profitable to do more. In meeting the problems of reconstruction, more effective work can be done if those working within a field, such as history, science, English or mathematics, are organized into a committee. Such an organization and the work which is done will be effective in producing a broader concept of the work of the school.

It is but fair to mention here that, according to their own estimate, six of the High School teachers are now devoting from 50 to 60 hours per week to school work. If this estimate was carefully made, the matter should be investigated. Such totals are too large. It may be that some of this time is spent in ways which are only slightly valuable. If so, the teacher should be aided in employing his time to a better advantage. If not, the work assigned to these teachers should be lessened. In either case time should be provided for the types of activities just suggested.

At present no drawing or fine art is taught in the Leavenworth High School beyond a brief course for normal-training students. This is a serious lack, since art enters so largely into everyday affairs, and has industrial

as well as æsthetic value. These facts apply with even more force in the High School than in the grades. It is suggested that the work of the art department be extended to the High School, and that the courses in the High School be closely related to the courses in domestic art and manual arts. The work given should include the designing of furniture, the planning and decoration of houses, and costume designs, including millinery. A general course in applied design, which includes the designing and making of projects in a variety of matrials and processes useful in home decoration, such as stenciling, block printing, and embroidery, would be a profitable course for all students as a means of developing appreciation of the relation of art to everyday affairs.

Music also is not taught at present in the High School, except a brief course for the normal-training students. We pointed out in the section on the educational needs of Leavenworth that it was vitally necessary that boys and girls acquire ideals of and capacity for wholesome leisure activities. Listening to music and producing it are recognized the world over as among the most wholesome of recreations. It is recommended that the course in music be extended into the High School. Chorus singing, music appreciation and orchestra are some courses which would be very profitable. The High School is already giving credit for music taken under properly qualified private teachers. This plan may be combined with such a music course as just suggested.

CHAPTER XXIII.

COMMERCIAL SUBJECTS.

Walter S. Monroe.

ONE of the five parallel courses in the High School is the commercial course. This course includes three years of English, two or two and a half years of mathematics, one year of science, two years of bookkeeping, two years of stenography and typewriting, and a year of commercial law and commercial geography. The remainder of the fifteen units required for graduation are elective. At the time of the Survey a total of 65 were enrolled in bookkeeping and 42 in stenography and typewriting. This means that practically one student out of every four is taking commercial work, and presumably the commercial course. Since the course is elective, this speaks well for the appreciation of the work by the students.

Among the changes contemplated for the future is a course on penmanship and letter-writing. As the commercial course was outlined to the writer, no provision appears for handwriting or business letter-writing. By all means the course should include such work. Other contemplated additions are commercial arithmetic, economics, and what the instructor has called, "The World's Work."

RECOMMENDATIONS.

The first two of these subjects are quite generally recognized as belonging in the commercial course. The last is seldom found, but if commercial work is to be connected properly with the activities of the business world these activities must be studied. If not studied incidentally in connection with bookkeeping, commercial arithmetic, commercial law, etc., they should be given a place as a separate subject.

The writer did not learn of any provision for household accounting. Such a course is very valuable for both boys and girls, and will find an application in the lives of many more than will commercial accounting or typewriting. For a beginning in this direction, the present course in bookkeeping might be supplemented by a few weeks devoted to household accounts at the end of the course, similar to the way in which the regular course in chemistry is supplemented by six weeks on household chemistry.

No provision is made for a young man or young woman who is working and wishes to study one or two commercial subjects, say bookkeeping or stenography and typewriting.

Neither is provision made for mature boys and girls who wish to prepare themselves for a commercial position within one or two years. In the past, young people of Leavenworth have had to go to private business colleges.

The Commissioner of Education, in his 1912 report, says:

"School administrators have learned that more pupils will be reached if short, practical courses are offered in the high school than if adherence to the rigid four-year course is insisted upon. Some children, because of home conditions, age and other considerations, know that they never will be able to complete the traditional high-school course, so drop out of

school altogether at the end of the eighth grade. In a number of cities two-year and other shorter courses have been provided for such pupils. Preparation for commercial and industrial pursuits and other vocational training are usually given in these abridged forms of the high-school curriculum. From reports received by the Bureau of Education, these shorter periods of secondary school work are proving popular without affecting attendance in four-year courses."

CHAPTER XXIV.

ENGLISH IN THE HIGH SCHOOL.

Minnie E. Porter.

LITERATURE.

THE choice of classics for study, throughout three years of the high-school course, has been limited to the college-entrance requirements which have been accepted by the University of Kansas and embodied in the state course of study for high schools. These requirements are divided into five groups, representing these literary types: epic poetry and story, fiction, lyric and narrative poetry, drama, and general prose. Two classics must be chosen from each group. In addition, the following classics are required for careful study: Macbeth, Milton's Minor Poems, either Burke's Speech on Conciliation or both Washington's Farewell Address and Webster's First Bunker Hill Oration, either Macaulay's Life of Johnson or Carlyle's Essay on Burns. The English course at Leavenworth shows few variations from these requirements. Of the last-named requirements, the course does not include either the argumentative speech or the essay. The initiative of the teachers has not substituted anything in place of these. Twelfth Night has been substituted for the Merchant of Venice in the second year, and Treasure Island is used in the first term of the first year instead of the second term.

The lists of books for home reading submitted by the teachers show evidence of a desire on their part to meet real needs. The lists show that the teachers have made five selections from the collateral reading recommended by the state course of study, eleven selections from the college-entrance requirements, and twenty-eight selections of their own. In one list nine books are modern fiction. With the exception of three plays of Shakespeare selected for the third year, all the books for home reading are prose fiction. These recommendations show an effort to meet the need of shaping the voluntary reading of the pupils, but the field of effort so far is limited. While it is difficult to find entertaining reading for pupils of high-school age in the fields of biography and travel, the teachers should study such a list as given in the Report of the Committee on Home Reading of the National Council of English Teachers (1912).

In the arrangement of this home reading for the three years, we note and commend the effort to adjust the recommendations to the reading interest of high-school pupils of different ages. We are pleased to find in a first-year list, Tom Sawyer, The Deerslayer, and Poe's Prose Tales. Of forty-two eighth-grade boys who answered the question, "What books have you read this year?" nine preferred the Alger Books, ten the Motor Boys, and twenty-three the Rover Boys. These pupils will enter High School in September, 1914. The teacher who prepares a list of books for home reading for these boys must not only satisfy their desire for reading, but must shape and direct it. In the second year there is offered a

list of classic fiction. This is supplemented by a list of current fiction for easier reading:

Supplementary List.	*Substitute List.*
David Copperfield. *Dickens.*	Richard Carvel.
Old Curiosity Shop. *Dickens.*	The Crisis.
Dombey and Son. *Dickens.*	The Crossing.
Kenilworth. *Scott.*	The Price of the Prairie.
Ivanhoe. *Scott.*	The Winning of Barbara Worth.
Talisman. *Scott.*	The Shepherd of the Hills.
The Last Days of Pompeii. *Lytton.*	Bob Son of Battle.
Cranford. *Gaskell.*	Ramona.
Scottish Chiefs. *Porter.*	The Light that Failed.
Thaddeus of Warsaw. *Porter.*	
John Halifax. *Craik.*	
Ben Hur. *Wallace.*	
Jane Eyre. *Bronte.*	
The Mill on the Floss. *George Elliot.*	
Lorna Doone. *Blackmore.*	

In the list for the third year the reading interests of the pupils have been considered, but the selections include three of Shakespeare's plays and a list of representative English novels which supplement the history of English literature. On the whole, this report on home reading shows the initiative of the teacher is exercised to meet the real needs of the pupils as determined by their reading interests through the three-year course.

COMPOSITION.

The general recommendations from the college-entrance requirements, that practice in composition, oral as well as written, should extend throughout the secondary school period, are embodied in the course in Leavenworth. The state textbook, Stebbins' Progressive Course in English for Secondary Schools, has determined the choice and arrangement of the work in composition.

In the use of the textbook the teachers have followed the line of least resistance. They have accepted the spiral arrangement as inevitable, and have taught Stebbins Part I in the first year, Stebbins Part II in the second year. This is a result of lack of coöperation in planning the course to avoid the unsatisfactory spiral arrangement. The state course of study presents some valuable suggestions in the arrangement of a course of composition using Stebbins' textbook, but the teachers have not been influenced by these helpful suggestions. In fact, the lack of initiative is shown in the description of the course in composition for the first year, which follows exactly the order of the textbook.

The subjects for the work in composition have been taken from a wide range. It is in this matter of subjects for composition work that the teachers have shown their originality and initiative. Two methods have been used with the pupils in helping them find subjects for compositions. In one case the teacher had prepared on the blackboard a list of suggestive subjects, from which each pupil would choose one for oral composition. The subjects were of the nature of those which pupils of the first year would choose, but these boys and girls were deprived of the pleasure and the training in discovering subjects for

themselves. In another case current news articles were chosen from the point of view of interest for the class.

Another venture, which promises more in real training than either of the two mentioned, is the search for subjects dealing with local material. This search for material is a process of awakening a live interest in the world of affairs in the city of Leavenworth and in the high school community. The search for concrete material also provides a real desire for expression. The best among these compositions are printed in the Leavenworth *Times*. The city of Leavenworth is listed as a textbook. That the life of the community will furnish abundance of material for composition there is no doubt. The helpful coöperation of the newspapers of the town in giving publication to the writing of high-school pupils is strongly recommended. In the absence of a school paper or magazine, or a school print shop, the newspapers furnish the only assurance of publication.

The initiative of the teachers is not limited, however, to the choice of subjects for composition. The course shows the result of the exercise of this initiative in planning a fourth year of composition as an elective. The University of Kansas now provides for accrediting a fourth year of English, provided that the work is approved by the University, which has made no attempt to mark out the content or the scope of the course. Any high school in Kansas is free to plan a year of elective work in English, provided that it is of high grade and serious in purpose. With this opportunity, Leavenworth has reached out this year in a course in journalism and short-story writing.

ALTERNATION OF COMPOSITION AND LITERATURE.

In the report of teachers of first-year English we find this statement: "Monday, Tuesday and Thursday are devoted each week to the *regular course* as it progresses. Wednesday is known as theme day. Friday is oral-composition day." The teachers of first-year English observe this program throughout the year.

An examination of the actual results of such a program shows the disadvantages of the arrangement. The writer observed a class on Tuesday enjoying the first chapters of Treasure Island. The story made its appeal at once. With the interest thus aroused, the boys and girls were ready to read on with the story, and would naturally look forward to the enjoyment of the story on the following day. But this could not be, for Wednesday was theme day. The next assignment was made as follows: "Read the next three chapters twice for Thursday." Thursday the class met to enjoy more of the story, although we are quite sure each boy did not read the next three chapters twice. He must have read as far ahead as time would permit. But this pleasure in a most thrilling part of the story must be broken again, for Friday was oral composition day, and they would not talk about Treasure Island. Further consideration must be postponed until Tuesday. When a boy's interest is once aroused in Treasure Island he sits up at night to finish it; he does not wait for any program outlined by a university for accredited schools.

But if there is an element of loss in the study of a classic, we must consider the effect of this arrangement upon training in composition. In the reports of teachers for the second-year English we find that Wednesday is theme day *each alternate week,* and that every Friday is oral composition day. The study of the classics named is the principal work of the course. One day each alternate week would allow eighteen class periods for written composition in a course which is outlined to include the *advanced* work in narration, description, exposition and argumentation. In oral composition thirty-six periods are allowed of thirty-five minutes each. If in a class of twenty-five pupils the teacher used a maximum of ten minutes for instruction and suggestive criticism, and if the pupil spoke in the class hour, one pupil could be allowed but one minute of the remaining twenty-five. And even with this unsatisfactory arrangement each pupil could speak but once a week. Training in composition, in writing or in speech is training in an art in which skill is developed by frequent practice. Under the conditions just set forth a teacher can not develop skill in untrained and immature pupils.

The result of this arbitrary division of time has been to throw the emphasis upon the teaching of the literature as the *regular* or *major* part of the course, and to make the teaching of composition, both oral and written, less effective. Under these circumstances, the lessons in composition appear to the pupil to be an unnecessary interruption to the regular course in the reading of English classics.

While the subjects of literature and composition are carried on side by side, as has been indicated, there is little relation between the two. In the first-year English there are two independent courses offered. The state course of study suggests that the relation be "not so much in subject matter as in character of appeal." This relation is not marked in Leavenworth except in the course in short-story writing, which is a course in composition. The stories used serve as models for the study of the technique of the short story. In the third year, which has as its basis the survey of the history of English literature, the literature and composition are related in subject matter. The study of Macbeth was followed by a debate in the Shakespeare and the Bacon theory. This was given as an illustration by the teacher as a means of bringing argumentation into the third year. Another report reads as follows: "Each pupil chooses a different subject. Reading is done in the library upon works referred to in the textbook on the history of English literature. The reports are read in class so that each pupil may derive benefit from the work of the others." The writer examined the compositions of two classes in the assignment of the subject, "The application of the poem, The Crisis, to the French Revolution." This subject grew out of the reading of The Tale of Two Cities in the second year. As a problem in literary study it has some value, but as for training in composition, the real motive for composition—the desire to express one's self for a real audience—was absent. Here it will be seen that the emphasis is upon the study of literature. Composition is used as an aid to this study, as it may be an aid to the study of history

and geography. In the main, then, we conlude that while literature and composition are taught side by side throughout three years of the high-school course, they are treated as two unrelated courses.

RECOMMENDATIONS.

The attempts to adapt the teaching of English to local needs place the teachers of English in Leavenworth in the line of definite progress. We recommend that steps be taken toward making definite plans in the coming year for the study of the problem of the reorganization of the English work in the High School. The initiative shown thus far in the adaptation of the teaching of English to the needs of Leavenworth has been the result of *each teacher working independently.*

An organization of the department for next year should be made by the appointment of one of the four teachers of English as chairman of a committee on reorganization of the course of study in English. The teachers of English and the principal should constitute this committee for serious study during the coming year. The principal can not be expected to take the place of a specialist in English or of the head of the department. He must bring to the work of the committee the view of the school as a whole and of the function of English teaching in relation to the other work of the school.

This committee of high-school teachers of English should become a part of a larger committee, composed of the superintendent, the principals of the buildings containing seventh and eighth grades, and the teachers of English in these grades. The teachers of first-year Latin and German should identify themselves with the work of this committee so far as it concerns itself with the question of the teaching of grammar. The problem of the seventh, eighth and ninth grades is recognized by the National Committee as one problem—the problem of the intermediate school. The unfortunate gap, in the method and subject matter, between the eighth grade and the High School should be lessened. Then, too, the teachers of departmental work in English need the point of view of the teacher in the High School in dealing with the older pupils in the grade schools. But more than that, the teachers of English in the High School need the help of the experience and sympathetic understanding of the eighth-grade teacher and the principal.

CHAPTER XXV.

HOUSEHOLD ARTS.

Ella V. Dobbs.

HOUSEHOLD ARTS in the Leavenworth High School is an elective subject in the general and industrial courses. Two periods or eighty minutes daily are devoted to the subject, and two years' work is given at present. Plans are in contemplation for its extension to four full years as soon as circumstances will warrant. When the courses were first organized the time was divided between domestic science and domestic art, lessons being given in each subject on alternate days. Later the present plan of devoting alternate quarters to each phase of the work was adopted and found to be much more satisfactory. The further extension of the term of consecutive study in one field to one-half year is now under consideration. This plan has much to commend it, giving greater opportunity for concentrated effort.

SEWING.

The work in domestic art includes the cutting and making of plain garments, such as the more complicated undergarments and a wash dress. In the second year a wool skirt, a tailored shirt waist and a lingerie dress are made. The course includes the drafting of patterns to measure as well as the use of prepared paper patterns. The study deals with the theory as well as the practice of the necessary processes, with the quality of cloth and the control of its tendency to fade and shrink, with the suitability of material to specific garments, and with suitable styles of clothing for specific occasions. In many instances the members of the class are wearing the garments they have made, and in several instances a very marked improvement in the neatness of dress and in the care of the person is noted as a direct outgrowth of the study.

COOKING.

The course in cooking includes the care and sanitation of the kitchen, the cooking and serving of simple meals, a study of food values and their relation to health, and a brief study of home planning and furnishing. In addition to the ordinary lesson, in which a specific dish is prepared and for which materials are specially provided, emergency lessons are given as occasion offers, in which the class is expected to make use of the left-overs in a scant larder and evolve something appetizing, very much as the housewife must often do for the unexpected guest.

Each student must also prepare a test menu of properly balanced food values, cook and serve the meal. In these meals a definite cost limit is set. In actual practice the cost ranges from ten to twenty-five cents per person served, the latter being the cost of a luncheon served to the school board.

In selecting subject matter for class work, emphasis is placed upon methods of preparing appetizing dishes from the less expensive materials, such as the cheaper cuts of meat and the less popular vegetables, in order

to impress upon the girls the idea that good cooking is not necessarily expensive cooking, and that economy is an essential in good housekeeping. The course also emphasizes the more substantial elements in cookery rather than what are sometimes termed "frills." For example, only one lesson in the year is given to salads.

In the conduct of the classes, each girl is provided with a set of the essential cooking utensils, which must be kept in orderly fashion in the cabinet assigned to her. Each lesson, with a few exceptions, is a complete unit. For example, in a lesson on the cooking of cereals, the chemical and biological principles involved and the relative merits of different methods of cooking are discussed. The pupils then individually test these methods by cooking the cereals in accordance with the principles discussed and noting the effect of different processes.

Such a lesson also calls for prompt and systematic work on the part of each student, since the work must be completed, the dishes washed and returned to their places, and the laboratory left in perfect order for the next class, which will assemble within five minutes after the first is dismissed.

In the study of house planning, attention is called to the points to be noted in the selection of a rented house and the choice of the site for a house which is to be built, such as drainage of the lot, relation of the house to the direction of sunlight and prevailing winds, provision for proper sanitation within the house, provision for convenience in working and guarding against waste of time and energy in useless steps and movements. It also touches upon the selection of furniture and the choice of wall decorations and draperies. The time to be devoted to house planning is inadequate for more than a few suggestions concerning the chief problems involved.

The organization of the courses in home economics in the High School follows approved lines and gives evidence of efficient execution. The suggestions to be offered in this field are chiefly in the line of extension, and many of these suggestions are already in contemplation by the supervisor and superintendent.

RECOMMENDATIONS.

The next step should be a course in millinery. This could be introduced without extra equipment of any importance, and would add materially to the value of the department. It is suggested further that definite study in fine art be made a part of the required work of the course in domestic art. Such a study should deal with problems of costume design, house furnishing, and decoration. In costume design, the fundamental principles may be tested and applied in color sketches and in the dressing of dolls and small models, as well as in specific application to such problems as are presented in the actual garments and hats to be made by the individual students. The study of house planning may include the making, comparing and criticizing of various house plans, a study of the cost and durability of various materials, and a study of desirable color schemes and suitable furniture. Such study may be illustrated by water-color sketches and by miniature models of rooms done in thin wood and cardboard, which bring out many points not touched by the flat sketch.

It is the common practice in the teaching of domestic science to use individual recipes calling for small quantities of material, and allow each pupil to perform all the steps in each process. While this plan is generally satisfactory, it gives the student little or no practice in handling the larger quantities needed in the average family. To meet this need, two general plans are being tried with considerable success in various places. The first is that of giving school credit for definite home work, such as preparing for the family a recipe which has been tried at school. This plan may be arranged in any school without material increase in expense. The second plan is that of providing a house or a suite of rooms which are to be lived in and cared for by the students, each member of the class being responsible for certain work for a given length of time. This plan has much to recommend it, but involves considerable expense and careful supervision. The problem of the school lunch offers another means of bringing real problems into the classroom by the preparation of a simple lunch for those who remain during the noon hour. This plan is open to the criticism that it is apt to narrow the work of the class by requiring too much time for the preparation of a few dishes, especially if large numbers are to be served. The immediate needs in the Leavenworth High School seem best met by the first plan outlined.

It is further suggested that a close correlation be maintained between science and cooking courses. The present educational tendencies suggest that science courses, particularly chemistry and biology, be planned to parallel the work of the cooking classes, in order that as questions arise in the manipulation of food materials it may be possible to find answers to them through experimentation in the science laboratory. Such parallel courses should be taken simultaneously. This plan would go far to forestall the distaste many girls profess for science when taught by formal methods and logical organization. By the present arrangement of courses in Leavenworth, many girls do not receive any instruction in chemistry other than that given in the cooking laboratory.

One of the common criticisms of a school course in household arts, especially in the early days of its history, was that too much time is devoted to the preparing of dainty dishes and too little to the common tasks of fire-building, dish-washing, and the plain cooking of meats and vegetables. Such critics are reminded that skill in the preparation of food, as in any other mechanical process, is a matter of long-continued repetition; that ability to carry on several processes at once, such as is required in preparing even a simple meal, and to bring those processes to a successful issue at an exact moment, is also the result of long experience. The school can not give this experience; at best, it can only lay a foundation for it and direct the course it shall take. These critics would doubtless be even louder in their criticisms if the school were to confine its work to the repetition of a few fundamental processes. It should also be remembered that the preparation of a dainty article of food or the making of an attractive garment may often awaken an interest leading to greater effort, whereas the more prosaic task may have the opposite effect.

CHAPTER XXVI.

MANUAL TRAINING.

Ella V. Dobbs.

THE FUNCTION OF MANUAL TRAINING.

COMMON PRACTICE in public schools has developed two general types of handwork, growing out of two conceptions of the value of the manual arts. In the one, handwork is regarded as a cultural subject, having equal if not greater value than the accepted book subjects as a means of mental development. The other regards handwork as a vocational subject, having subject matter of intrinsic value. The former seeks a broad acquaintance with tools and materials for the sake of developing an appreciation of material things. The latter emphasizes technical skill with a view to later training in a trade.

Until recently, public-school courses in handwork have strongly emphasized the cultural values, with the result that often after spending considerable time upon handwork the high-school graduate has a smattering of many processes but no marketable skill. Present interest is directed strongly toward the value and importance of the vocational aim in handwork.

The public is becoming more and more alive to the fact that the public school must be a school for all the people, and that the high school should not only serve those who expect to attend college and prepare for professional work, but should serve equally well those who choose mechanical pursuits. The old apprentice system which guaranteed full training in a given trade has disappeared with the small shop. The modern factory system has no place for the apprentice. Many factories are recognizing this need and establishing training schools in connection with their shops. These schools, in many instances, are doing excellent work. The public, however, can not afford to allow the training of its workmen to become a matter of private enterprise. The factory is interested chiefly in the product, and only secondarily in the boy. The temptation to narrow the training given, in the interests of the factory, would in many instances be too strong to resist. The public must see to it that a broad, general education parallels the technical training. This throws upon the school the obligation of providing opportunity for a reasonable amount of specialization in handwork, at least equal to the opportunity offered for preparation for professional work. This special study would of necessity be in addition to the handwork offered to all students for the sake of its cultural value. The problems arising from these obligations are all so new that there is as yet no well-defined consensus of opinion as to the extent to which any single course may be at once cultural and vocational. Nor has any one plan for vocational training as yet met with universal approval, though several plans are in satisfactory operation.

The chief point to be heeded is that the two values exist, and each community must meet both needs as fully as possible. The Russell Sage

Foundation, through Dr. L. P. Ayres, is making some interesting studies concerning the extent to which children enter local industries, and also what industries are to be found in all communities, with the proportionate number of jobs they furnish. These studies will help solve the problem of selecting the fields in which it will be profitable to offer specialized study in the high school.

HANDWORK IN THE LEAVENWORTH HIGH SCHOOL.

The course in manual training in the Leavenworth High School consists in advanced cabinetmaking in the first year and pattern making the second year, with a comprehensive course in mechanical drawing open to all students, whether they have taken bench work or not. The course in pattern making includes some study of foundry practice.

The cabinetmaking course includes the making of taborets, tables, chairs, bookcases, and other pieces of home furniture. The course is organized on free lines, each student selecting the project upon which he wishes to work and the design for it, subject to the approval of the supervisor. A sketch and working drawings are first made. From these the student works out a mill bill (*i. e.*, a list of the pieces of material needed and the dimensions of each), and a lumber bill (*i. e.*, the amount and kind of rough lumber needed). Sometimes he takes his bill to the lumber mill and buys his own lumber; in most cases he purchases his material through the school. He then proceeds to build and finish his piece of work. The number of pieces to be completed by one student in the year depends entirely upon the amount of work involved in each, and varies according to the projects chosen. Each pupil pays for his own material and owns the finished product. In a few cases in which a boy can not afford to buy material, he is given work to do for the school, or is helped to earn his material. The projects all being of their own choosing, each worker usually has a definite purpose in his work. He therefore wants what he makes, and is willing to make some sacrifice, if necessary, to obtain it. This definite purpose also furnishes a strong motive for good workmanship, and many excellent pieces of work are turned out.

The course in pattern making includes the making of six common founders' patterns. These patterns require great accuracy and call into play the pupil's knowledge of both turning and bench work. The making of the patterns is accompanied by a study of foundry problems. The present equipment does not permit actual work beyond the making of the patterns. The equipment needed for the founding of small pieces of brass and white metal could be installed at a comparatively small cost and would greatly increase the efficiency of the course in pattern making. It could be further supplemented by visits to local foundries, such as the stove works.

MECHANICAL DRAWING.

The course in mechanical drawing includes geometric problems, working drawings, machine and architectural drawing. The geometric problems make a concrete application of geometric principles, and form an excellent parallel to the study of geometry. The working drawings deal with various projects in cabinetmaking and machine

building. The architectural drawing includes house plans and elevations. The climax of this year's work is a plan for remodeling the High School building in a way to increase greatly its usable space. The pupils taking this course have not all had bench work. The practical knowledge gained in handling materials and the use of working drawings in bench work is of great advantage to the student of mechanical drawing, and is evident in a comparison of the work of those who have and those who have not had bench work. Occasional excursions are made to furniture factories, which give the students an insight into actual factory problems and conditions and a better appreciation of the function of the draughtsman's work. A readjustment of required and elective work in the High School which would allow the student of mechanical drawing more time at the bench would undoubtedly be of advantage in the study of that subject.

In addition to the work above outlined, advantage is taken of opportunities for gaining practical experience in repairing and remodeling the classroom. For example, the present class is fitting the tool room with shelves and cabinets for a systematic care of the tools and small stock, such as nails, screws, etc. Another group is at work enclosing the open stairway leading to the hall on the first floor. The enclosing of this stairway will shut out much of the noise of the workshop and add greatly to the comfort of the classes on the first floor.

RECOMMENDATIONS.

The writer finds little to criticize and much to commend in the organization and conduct of the manual-training department of the High School. The work given is practical and the standards of workmanship are high. The suggestions to be offered are chiefly along the line of extension and progress.

A closer correlation between handwork and book subjects, such as geometry, physics, chemistry and industrial history, would add to the interest in each field. The advantage of practical experience in real problems, such as the two cited, is not apt to be overestimated. There are usually some members of every class who are much happier and more successful in work of this type, and the work need not be confined to the workshop, but may be extended to include any problems which are within the ability of the students.

The fact that Leavenworth has a large variety of manufacturing interests with which some of her high-school pupils will probably be connected in the future suggests a close correlation between them and the work of the High School.

CHAPTER XXVII.

MATHEMATICS IN THE HIGH SCHOOL.

Walter S. Monroe.

THE COURSE OF STUDY IN ALGEBRA.

THE mathematics in the Leavenworth High School consists of one and one-half years devoted to the study of algebra, one year to plane geometry, one-half year to solid geometry, and a year to trigonometry. It will be illuminating to take an inventory of the course in algebra to determine what occupies one-fourth of the time which the boys and girls of Leavenworth spend in high school for a year and a half. What is said with reference to Leavenworth is equally true for many if not most cities in Kansas, because of text which is prescribed by law. In the first place, they solve the grand total of sixty-nine problems, which might possibly be practical. They have learned how to operate with negative exponents, although they will not have a real need for them before they study calculus in college. They have solved intricate fractional and radical equations, which are far more complicated than they will ever meet in life outside of the schoolroom unless they perchance choose engineering as a profession. They have spent several weeks studying factoring, although only the very simplest cases of factoring are useful in solving practical problems, and these very seldom. An elaborate study has been made of fractions with binomial and larger polynomial denominators, although such fractions seldom if ever occur in practical problems. Division has been studied, although the only use which is made of it (beyond the most simple cases) is to find the highest common divisor by the Euclidean process, which is itself an obsolete topic.

A careful examination of the course of study fails to reveal anywhere even a passing consideration of the situations in practical life in which the algebraic symbols and operations are used. Thus the subject matter of the course is *abstracted*—taken away from practical situations in life in which it may be used.

A survey of this abstracted subject matter reveals the further fact that only a small per cent of it will ever be used in practical life by any one except those few who pursue certain technical professions.

The order in which the several topics are taken up is also significant. The several operations of algebra—the four fundamental operations, factoring, the work of fractions, etc.—have scarcely any use except as they occur in solving equations. Thus it seems that if this abstracted subject matter must be taught, it would be so arranged that the pupil would find a use for the operation at the time or before he studied it. However, an examination of the text shows that the order is such that the pupil must study a process and be drilled upon it before he is given any suggestion of its use or allowed to use it in solving even an abstract equation.

It was found that the teachers were altering the order of the text in a number of instances. This is commendable, and greater initiative will be

profitable if the several processes of algebra are brought closer to their application. One case of initiative on the part of a teacher was found which produced just the opposite result, and while the exercise of initiative is to be commended, the result which was produced is to be criticized.

The examination of the text also reveals the fact that the boys and girls who began algebra last September (1913) had met with only twenty-three equations and a few problems by the middle of March (1914). This means two things: First, the boys and girls of Leavenworth, after studying algebra for approximately seven months, could not solve equations which in a great many high schools the pupils can solve after two to four months. Second, the boys and girls of Leavenworth have been kept working for seven months with algebraic processes which they have had no opportunity to apply even in an abstract way.

THE TEACHING OF GEOMETRY.

In geometry the teacher is exercising initiative to the extent of preparing mimeographed lists of the theorems and exercises which are given to the pupils by way of assignment. These exercises and theorems are selected by the teacher from a number of texts and are organized "according to the recommendations of the Committee of Fifteen." The teacher reports that "the main object is to make the pupil work out his own proof instead of memorizing proofs in the text." Such great exercise of initiative is to be especially commended, and the fact that the course is based upon the Report of the Committee of Fifteen shows that the teacher has kept in touch with recent movements. But it should be pointed out that the Committee of Fifteen were primarily concerned with determining a list of theorems essential to the field of geometry, and only secondarily with applications which are made of geometry in actual life.

Thus the subject matter of geometry as it is taught in Leavenworth is essentially abstract. As such it is well taught, and the teacher is to be commended for her initiative and the energy which she is putting into the course. But if some of this initiative and energy were directed towards relating the theorems of geometry to practical life, a much superior course might be worked out.

The course in trigonometry is elective and follows closely Wentworth's text. A full year is given to the subject. That this is too much time is indicated by the fact that the course is valued at one-half unit, or half of a year's work.

RECOMMENDATIONS CONCERNING THE COURSE OF STUDY.

To begin with, the teachers of mathematics in the Leavenworth High School should collect problems in which high-school boys and girls may be caused to become interested. Some such problems can be obtained from other algebra texts. Others can be found in the fields of physics, manual training, mechanics, surveying and calculus. A study of the adult activities of Leavenworth will yield a number of suitable problems.

The list of problems thus collected should be graded, and the problems which are too difficult or which come from too highly specialized situations should be eliminated. At first these problems may be used simply as applications for the processes of algebra and the theorems of geometry which are now taught.

This list of problems can be mimeographed and placed in the hands of the pupils. Their present text can serve as a reference for obtaining the necessary algebraic and geometric tools for solving these problems and as a source of drill exercises. To provide time for these problems of application, eliminations can be made from the subject matter of the present courses in algebra and geometry. For example, long division, factoring beyond simple cases, negative exponents, much of radicals, complicated fractional equations, literal equations, etc., can well be omitted. But this should be only the beginning. It should be the aim to work toward a course in mathematics whose core will be these problems together with the practical situations from which they are taken. Along with the problems the pupils should be given the algebraic symbols and operations, the geometric and trigonometric facts, and even the operations from analytics and the calculus which they need to solve the problems. Sufficient exercises should be provided for the drill which is necessary in order to secure facility in performing mathematical operations.

Along with the problems, the practical situations from which the problems come must be studied. For example, if a problem is taken from physics, the situation in physics which produced the problem must be understood by the pupils before they can be expected to solve the problem; or if a problem is given from one of the local industries, the practical situation which produced the problem must be studied. Practical situations which produce mathematical problems are legitimate subject matter for the class in mathematics which is solving the problems. In fact, the practical situation must be clearly understood by the pupils before they can possibly work the problems intelligently.

Such a course as we have indicated should not cover more than two years' work. In one school where such a course has been given it is followed by a year's work on algebra and geometry of the usual type. This year should be elective. The practical part of trigonometry will be absorbed in the reconstructed course we have outlined, and when that is accomplished a separate course in trigonometry should not be given in the high school.

ALGEBRAICAL ABILITIES.

To test the results in the case of algebra, a series of six tests* was planned for those students who began the study of algebra last September. The tests called for the following algebraic operations:

TEST A. $4(3x-4) =$.

TEST B. $\frac{-7x-2}{6} + \frac{x+1}{8} =$. (Simply reduce to a common denominator.)

TEST C. $35x = -41$. (Result to be left in fractional form.)

TEST D. $-4x + 5 = 3x - 5$. (Only to transpose terms.)

TEST E. $-7x - 3x - 6 + 4$. (Terms to be collected.)

TEST F. $\frac{-3x-2}{4} = \frac{x+2}{6}$. (To be solved completely.)

* Owing to a misunderstanding, test B was not given in the Leavenworth High School.

This series of tests was selected because of the fundamental importance of the equation. In solving problems the conditions of the problem are expressed in equation form and then the equation is solved. And besides, the work of the first year is centered about the equation. The pupils use the algebraic operations in a practical way only as they occur in equations.

In giving a test, a copy was given to each pupil and printed directions were followed. The pupils were asked to write their names and the date and to read the directions at the top of the page. When they had signified that they understood what they were to do, the signal to begin work was given.

The time allowed was: Test A, 2 minutes; test B, 3 minutes; test C, 1 minute; test D, 2 minutes; test E, 3 minutes; test F, 12 minutes.

To provide data for comparison the same tests were given to all of the corresponding classes in the Oklahoma City High School. The same instructions were followed, and only three persons were employed in scoring all of the tests. With the exception of test F, in the Leavenworth High School, the tests were given in March. Test F was given in the Leavenworth High School in May. The average number of examples attempted, number right, and the per cent right for each school, are given in the following tables:

TABLE XXXIII.

Leavenworth High School—79 pupils.

Test	*A.*	*B.*	*C.*	*D.*	*E.*	*F.*
Attempted.	18.0	....	8.8	6.9	8.8	6.2
Right.	15.3	....	5.0	3.8	5.6	1.4
Per cent right	85	....	57	56	63	23

Oklahoma City High School—197 pupils.

Test	*A.*	*B.*	*C.*	*D.*	*E.*	*F.*
Attempted.	17.0	4.8	7.9	9.3	10.2	5.7
Right.	14.6	1.5	6.8	7.6	6.8	1.9
Per cent right	86	30	86	82	66	32

An analysis of the mistakes made by the pupils in Leavenworth in test F gives the following data:

Total number of mistakes in sign	400
Mistakes in sign in transposition	77
Mistakes of using sign wrong in addition	28
Mistakes in sign in division	5
Mistakes in copying	59
Mistakes in arithmetic, any sort	87
Using denominator wrongly in two-term equation	158
Using denominator wrongly in three-term equation	10
Using common denominator wrongly on monomial term	35
One term of binomial not multiplied	14
Term omitted	10
x omitted	8
Incomplete as $-x = 5$	2

Of the 400 mistakes in sign, 110 occur in addition (and subtraction), division, and transposition. The remaining 290 occur in multiplication and in the removal of signs of aggregation. All of these operations are

given in the first chapters of the text and were probably studied in the first month of school and used frequently in the following months. When this test was given in the seventh month of school, 400 mistakes in sign were made in solving 437 examples.

The mistakes due to omitting a term or x, failing to multiply one term of a binomial, and to copying, total ninety-one. These are purely matters of carelessness. The eighty-seven mistakes in arithmetic should probably receive the same classification. The mistakes is using the denominator wrongly total 203.

Upon the basis of the results of these tests and of the observations of the writer which corroborate these results, three recommendations are made with reference to the teaching of algebraic processes. First, the instructors should evaluate the several algebraic processes which are given in the text and select those which are fundamental to the solution of equations. These, together with the equation, should be given first rank in importance. Second, sufficient drill should be given to insure a higher degree of accuracy. To make this drill most effective, there must be concentration and a feeling that it is good for something. This leads to the third recommendation: The algebraic processes involved in solving equations should be taught so that the pupils will realize their use, and the equation itself should be taught so that the pupils will appreciate its value as a tool in solving problems.

CHAPTER XXVIII.

NORMAL-TRAINING COURSE.

W. W. Charters.

THE FUNCTION OF THE COURSE.

THIS normal department belongs to the type of normal department found in the high schools of Kansas as provided by the state laws and supported in part from state funds. In it are taught the subjects prescribed by law.

It has a further duty to perform in Leavenworth, however, since vacancies in the first four grades of the schools are filled from the graduates of this department after they have taught one year or have substituted, as occasion requires, for one year.

This means that Leavenworth, a city of over 20,000 people, paying a median salary of more than $650 to its teachers, is supplied almost entirely in the first four grades and in part in the upper grades by teachers who have only a high-school education (partly professional) and have had one year's experience in teaching when selected.

Moreover, it is not required that prospective teachers take manual arts, sewing, nature study or physical training during their high-school course, although they are required to teach these subjects in the grades. Drawing is studied two periods a week for a year—an inadequate amount of time. Music is taught for one period a week, which may be inadequate.

RECOMMENDATIONS.

I recommend the following changes:

(1) That preference should not be given in a city of 20,000 people to graduates of its own training class. The training so secured can not be the equal of that received by a normal-school graduate in either quantity or quality. The city can not maintain the equal of a normal-school faculty. Moreover, there is a great tendency to inbreeding. There are undoubtedly cases in which the graduates of the training department in a small city are superior to applicants trained elsewhere, but that is the exception and not a rule. Consequently, when teachers are to be selected, the greatest care should be taken to select the best teachers available, whether trained in the home training classes or not.

(2) The normal department in the High School should have, as at present, one course conforming to the state requirements, and should aim to train teachers under state regulations primarily for rural and small graded schools. But if it attempts to train teachers for the Leavenworth schools there should be a three-year course, including the senior year in the High School and two postgraduate years. During their high-school course those members of this department who expect to teach in the Leavenworth schools should be required to take full courses in cooking, sewing, nature study, manual arts, music, drawing and physical education with other high-school students, but preferably in classes containing only teachers in training, so that attention may be given both to subject

matter and to methods of teaching and organization. If these prospective candidates are taught with other high-school students, then in a course (or courses) in special methods the problems of teaching in these subjects should be discussed.

(3) The teacher of the normal department should be paid a salary at least the equal of the high-school principal in order that as efficient a director of teaching as possible may be obtained. Such a teacher could be utilized to take direction of the technique of classroom instruction in the grades of the whole system. He could help in spreading the latest information, in directing experiments, and in stimulating the teachers to investigate more efficient methods of teaching.

(4) The course of study for the normal department should be worked out with extreme care, so that all high-school courses already offered may be utilized to get the full use of experts in each line. Department teachers in the upper grades may offer courses in special methods of teaching the special subjects of each, and the department teachers should be selected with this possibility in mind.

(5) The board should immediately lay down the requirement that no teacher will be employed who has had no experience as a teacher, and none who has not had at least one year of professional study beyond the High School. This should be increased to two years if the salaries paid will command such training; and if not at present, the demand should be made as soon as possible.

CHAPTER XXIX.

PHYSICAL TRAINING FOR BOYS IN THE HIGH SCHOOL.

Walter R. Smith.

THE HIGH SCHOOL is built upon a block with two churches, a parsonage, and the public library. The building covers practically the whole of the ground owned, so that the ordinary needs of a growing High School will be met with difficulty and great expense even without considering playgrounds or a gymnasium.

With the possibilities of expanding the grounds about the building removed, and no other plans devised, physical training has been neglected. Athletic teams worthy of the city have not been developed. A cadet corps is maintained without drill grounds at hand. Gymnastics have received no attention. School loyalty and *esprit de corps* should not be dependent upon athletics; but many high schools have found that regular teams aid greatly in maintaining local spirit and holding boys and young men in school. They aid greatly in discipline of the higher sort. Failing to develop the athletic spirit in this age frequently means a failure in the development of the organizing ability and united effort needed in school enterprises. A large organization, almost wholly of high-school boys, was maintained through the city Y. M. C. A. This organization was a worthy one, doing efficient work, and the high-school principal was one of the three sponsors for it. But how much better for the school would it have been to have this organization within the school, working for the school, centering its loyalty and spirit about the school! Had there been a good spirit, grounded upon athletic prowess, with the good name of the school and her wider interests at heart, this might well have been a purely high-school organization.

NEED OF AN ATHLETIC FIELD.

The situation at present is a very difficult one. This was felt by the Board of Education, superintendent, principal, and the boys themselves. A new athletic spirit is awakening, however. The writer witnessed the celebration of the winning of a district basket-ball championship. Loyalty was not wanting. But winning seemed to be too new for Leavenworth, the largest city playing in the district. This might well be expected without a gymnasium, a regular field or a permanent place for practice. These handicaps produced discouragement past, present, and for the future.

No land is near the High School to be purchased for an athletic field without considerable expense. But lack of better planning in the past should not prevent action in the future. Every block in the neighborhood is built upon. Some land, however, can be purchased at much less expense than many other cities have paid under similar conditions. Within a short walk of the High School is at least one block which, considering its possibilities, Leavenworth could well afford to buy. This block is not only near the High School, but is only a short distance from

two of the larger grade schools—Oak Street and Third Avenue. A gymnasium could be built in one corner of it and a stadium easily planned. It would not only provide for the urgent needs of the High School, but could be freely used by the two grade schools now almost wholly without playgrounds, and might serve as a clearing-house for all the grade-school contests in the city. It would also provide a summer playground in the heart of the best residence district in the city, where no sign of one exists at present. All of these purposes combined should make it worth while, and it would be less expensive than the neglect to provide any of these things in the past would warrant the city in expecting.

PLAN SUGGESTED.

Probably half of this block could be purchased and a good practice field graded up for five thousand dollars. This might be done to start matters, and larger extensions be planned for the future. The writer, however, believes that Leavenworth is about ready for a larger plan. A canvass of the situation reveals the fact that the present tax levy will provide only for the running expenses of the schools and a small surplus that will be needed for the next few years in repairing, equipping and modernizing the grade-school buildings and adding to their playgrounds. If the urgent needs of the High School for physical training are to be met a small bond levy is indispensable.

Nor will that issue be a hardship upon the people. Leavenworth has been heavily in debt, and that debt has been reduced only by taxing her citizens heroically. It has not only been largely reduced, however, but it never was a school debt to any large extent. The bonded debt of the school board is now less than sixty thousand dollars. This is less than the school debt of any other first-class city in Kansas. The comparative debt of the schools of the first-class cities of Kansas in 1912 is shown in Table XXXIV:*

TABLE XXXIV.

	Total.	Per capita.
Wichita	$531,500.00	$10.13
Topeka	529,161.00	12.11
Hutchinson	261,500.00	15.98
Atchison	142,000.00	8.65
Fort Scott	135,000.00	12.90
Coffeyville	115,000.00	9.06
Pittsburg	90,000.00	6.09
Parsons	86,000.00	6.90
Leavenworth	65,307.78	3.37

The school tax and school debt have been comparatively light, and are so to-day. Progressive and effective schools cost money, but they return it many-fold. And the Leavenworth of the future will suffer in the competitive struggle for existence and progress unless a more liberal policy is adopted.

If Leavenworth can rise to the emergency and meet the demands of progressive schools, the first line of expansion is clear. All seem to be agreed. The citizens, Board of Education, superintendent and teach-

* The writer has been unable to obtain the figures for Kansas City, Kan., for 1912, but reports for other years indicate a large actual and average per capita debt.

ers, together with every member of the Survey Staff, are of the opinion that the thing most needed is extra space for playgrounds. A comprehensive plan should be devised to provide adequate play space for each school in the system. The budget necessary to carry out such a plan should be carefully made out, and a campaign of education of the public up to the necessary liberality to carry out these plans should be inaugurated at the earliest possible date. Leavenworth faces a critical period in her history, and the public school is a good point of departure for a civic renaissance. The reception of such a plan, if properly elaborated, would be a test of her future possibilities.

In the meantime something might be done to meet urgent needs. The high-school boys are started and are developing school spirit. This should be cultivated. Temporary grounds can be obtained and public patronage for all sorts of athletic events built up by judicious campaigning. The physical director should give some time to high-school boys, and some form of physical training should be given regular high-school credit. Supineness on the part of the school authorities, including the Board of Education, at this stage would not only be a serious mistake, but would amount to inexcusable negligence.

It has been shown in another place that the tax rate for schools has been uniformly lower in Leavenworth up to 1912 than in any other first-class city in Kansas, and that while Leavenworth has increased her annual rate to six mills on the dollar, it is still beneath the average for those cities. All these tests show that Leavenworth, judged by the Kansas standard, has long been and still is failing to support her schools liberally. If the bonded debt of the city be considered large, it must be remembered that only a little more than one-twelfth of it is school debt, and there is no reason for charging it up to the school board and the public schools.

NOTE.—The omission of physical training for girls in the report does not signify that it is considered unimportant by the Survey Staff. It is just as important that provision be made for the girls as for boys.—DIRECTOR OF SURVEY.

CHAPTER XXX.

SCIENCE IN THE HIGH SCHOOL.

Walter S. Monroe.

THE courses offered are in botany, chemistry and physics.

BOTANY.

Owing to lack of the necessary equipment, botany is taught primarily from books. Instead of commenting upon the subject as now taught, we shall call attention to certain community needs and suggest some features of a course which would contribute to those needs.

There is a vital demand for a high-school course in which boys and girls may learn of the propagation and cultivation of plants. How to produce and care for plants should form the core of the course, and the form, structure, activity, morphology, evolution and classification of plants and their parts should be studied only so far as they contribute to that end. The laboratory work should include actual work with plants. In one school the writer has observed students setting out shrubs to beautify the lawns of the residents of the city. The work was done under the direction of the teacher. Valuable service was rendered to the owners of the lawns, and the students received excellent laboratory training.

Often the students' own homes will furnish an excellent laboratory. Flower beds, cold frames, the garden, the lawn, and plants for the house, offer excellent opportunities for the best kind of laboratory work. In Massachusetts a home project plan very similar to this is being tried for teaching agriculture. (See Bulletin No. 8 [1914], United States Bureau of Education.) In addition there should be a school laboratory, and if possible a school garden. The Colebrook Academy in a town of only 3000 is equipped with a small greenhouse, and such is not beyond the future possibilities of Leavenworth.

CHEMISTRY.

For the teaching of chemistry there is a well-equipped laboratory and a recitation room which is used in common with the classes in physics. Except for the last six weeks, the course follows the state texts, Hessler and Smith, and White's Laboratory Manual. The last six weeks are devoted (*a*) in the laboratory to food and qualitative analysis, (*b*) in the lecture room to household, food, and practical chemistry.

A parallel course in practical chemistry is given by lectures, illustrated n most cases by lantern slides, and dealing with such subjects as natural vaters, impurities and purification, nitrogen and its compounds, the naking of ice and liquid air, the manufacture of sulphuric acid, and onization. Visits were made to plants employing chemical processes, as: vater softening, continuous and intermittent systems; laundry processes, lour bleaching, purification of city water, foundry processes, etc. Also visit was made to Kansas City, to the soap factory of Peet Bros., Griffin Wheel Works, glass works, brass foundry, and government assay and esting laboratories.

PHYSICS.

For physics there is a separate laboratory which is only moderately well equipped for work by the pupils. The total value of the apparatus is large, but many expensive instruments are valuable primarily only for lecture and demonstration purposes. For some of the student work there is equipment for only two or three groups, which requires that a large number of students work together. On one visit to the laboratory the writer found the entire class working with a single set of apparatus. Thus students' work in the laboratory is handicapped; but this is balanced in part by the varied equipment.

The classes in physics average 2½ recitation periods and 2½ double periods of laboratory work per week. The text this year is Millikan and Gale, A First Course in Physics. The Laboratory Manual by the same authors is used, and from this twenty-five of the most valuable experiments are selected, together with about ten others chosen from various standard texts, or made up to fit the apparatus at hand, and presented by mimeograph copy to the pupils.

Before an experiment is begun in the laboratory the principles involved are developed before the class. The pupil then does the assigned work and hands in at the close of the period a pencil copy of the data obtained in the experiment. This is handed back to him corrected and graded. If his conclusions are wrong they are rechecked in the afternoon or at the next laboratory period. Within a week after the data are collected the pupil hands in a write-up of his experiment, which includes (*a*) description of the apparatus used and method of obtaining the data; (*b*) drawing of essential apparatus; (*c*) answers to questions asked in the text, and a summary of general discussion of 50 to 500 words (giving references) of the subject of the experiment. For much of the work the pupils work in groups of two, more frequently in groups of four, and sometimes in larger groups, depending on the experiment and equipment.

Accompanying both recitation and laboratory work, and paralleling them as closely as possible, is a course of practical physics, which consists of:

(*a*) Lectures by the instructor and others upon such subjects as (1) production, measurement and use of extreme temperatures, (2) radioactive substances, (3) wireless telegraphy, (4) the X-ray and its use in medicine, (5) the gas engine and automobile, (6) artificial ice, (7) steam power-plant engineering, (8) use of electricity in the home. Part of these are illustrated by lantern slides, and they are reported by the class in an extensive theme.

(*b*) Visits to various industrial plants, such as (1) electric-light plant, (2) telephone exchange, (3) X-ray machine of physician, (4) wireless telegraph and laboratory at Fort Leavenworth, (5) furniture factory, (6) Great Western Manufacturing Company, (7) stove works, (8) Soldiers' Home power and heating plant, (9) bridge works, (10) roller mills, (11) state prison mine, (12) federal prison, (13) power-transforming station, (14) Fisher machine shops, etc.

During the spring one day is spent in Kansas City visiting the Armour packing plant, the Loose-Wiles candy and cracker plant, the Ridenour-Baker Wholesale Company.

These visits are gone over carefully with the class and a mimeograph copy of directions for a theme is given. These themes include from 1000 to 4000 words, and must show an extensive knowledge of the plant or industry visited.

A state text in physics is not prescribed by law, and last year a different text was used. Next year it is planned to use a text which has appeared within the last few months, or mimeographed copies of a text which the instructor is writing. This shows initiative on the part of the instructor, and the class can not fail to catch some of his enthusiasm.

As indicated in the outlines of the courses in the case of both physics and chemistry, there is a very evident attempt to connect the work of the classroom with activities of the community. This is in accord with present tendencies, and the writer believes that continued progress should be made in this direction.

It has been mentioned that the reports of visits to industrial plants "must show an extensive knowledge of the plant or industry visited." This is particularly important. The historical, economical and commercial aspects of the industry may be studied with much profit.

The outlines of the courses do not indicate that the pupils are allowed freedom for initiative in choosing laboratory experiments. Complete freedom can not be given, but if the size of the classes and the equipment permit, good results are often obtained by permitting some opportunity for initiative both in choice of experiments and in the method of working them out. Problems brought from home or from the community are excellent, if not too difficult, even though they are not found in any laboratory manual. Boys often become interested in constructing a steam engine, an electric motor, a wireless telegraph, etc. Such enterprises represent the best type of laboratory work if initiated by the pupil. However, they should not replace all of the set experiments, but may properly be accepted in lieu of certain experiments.

CHAPTER XXXI.

SOCIAL STUDIES IN THE HIGH SCHOOL.

Walter R. Smith.

HISTORY.

THREE units in history are taught. One is in ancient history during the first year. This is followed by a unit of mediæval and modern history, which in turn is followed by a unit of American history. One unit is required of all students; the others are elective. The required unit may be any one of the three, except that students in the normal training course must take American history.

Myers' Ancient History and Myers' Mediæval and Modern History are used as texts for the first two units, and Muzzey's American History for the third.

This course is the usual one. The texts are also not unusual, except that Muzzey is a much better history than is generally found in Kansas high schools. The regular topical questions and answers are in evidence in the teaching, and some supplementary reading and reference work is required. Maps are used in all rooms, and a reference library, rather full and fairly well selected, is at the students' command. One difficulty with the library is that older books and standard sets, both of which tend to frighten young students, are better represented than single volumes and newer books.

CURRENT EVENTS.

Many of the recitations were opened with current events. A student was called upon to give his current event. He rose and did so. Some were well selected and showed discrimination. Others were indifferently selected and poorly given. Most were passed by without criticism or comment. From five to ten minutes were thus used.

The whole of this part of the recitation was treated incidentally. No effort was made to correlate it with the subjects under study. One of the topics for the regular lesson was the Clayton-Bulwer Treaty of 1857. What a golden opportunity to direct the current events topics to a study of the Panama canal at present! Also to a comparison with the Hay-Pauncefote Treaty and its possible violation by the canal-tolls bill which President Wilson is now trying heroically to get repealed. Two or three days spent with the class studying this whole canal subject, from its beginning with the above treaty to the present hour, would do more to show students the value of history and give them historical-mindedness and historical training than several times the amount spent in isolated topical recitation.

Again, the value of current events depends in a large measure upon teaching the students to read newspapers discriminatingly. This can not be done without criticism from the teacher and making of each topic a matter for possible class discussion and estimate. One student did recite on an event in the Mexican situation which aroused discussion. But

the teacher gave the facts instead of holding the matter over for class investigation. There was no effort to get the class to follow the Mexican situation, which was by all odds the most important on the political horizon. It will thus be seen that the current-events work was deliberately made a side issue, and hence perfunctory, when it might have been made, especially in the senior American history class, the vitalizing feature of the whole study. It was an innovation to deal with current events at all; but one more step ought to be taken in dealing with them seriously and studiously. Current events are historical events, the most important of all historical events—the hardest to teach well, but when traced to their historical origins, the most remunerative of all history teaching.

THE TEACHING OF HISTORY.

The questions asked on the text were topical and well put. Most often they were put to individuals rather than to the class, and the individuals recited to the teacher. In general it may be said that there seemed too little recognition of the class as a body, as distinguished from a collection of individual students. There was one exception to this rule, in which the teacher had some pupils face the class when reciting, and the whole class were asked certain questions, showing a slight recognition of the class as a social group. In general there was little cross-questioning of students to train originality and independence of judgment. Nor was there sufficient perceptible effort in any class visited to connect historical events with present-day problems in order to furnish practical motives for work. History was taught as a static subject dealing with fixed facts, rather than as a study of causes and effects actively molding institutions and advancing civilization. Past society was divided vertically by chronological periods in the old way. Little special effort to vary this order by horizontal divisions, tracing institutions back to their origin or extending topical discussions forward and backward, was visible.

An illustration of possibilities along this line was presented in an ancient-history class observed. The class were studying Persian history. They had under discussion the Persian religion. Ormazd and Ahriman were pointed out as the struggling gods of good and evil. The simplest method of approach to drive home the facts would have been a comparison with the Hebrew religion. This would have been a lesson in comparative religion that might have aroused brain-stretching thought in addition to fixing the historical facts in mind. And the final element in motivation would have been to ask the pupils to point out the resemblances and differences between the Persian religion and their own.

Another illustration from the same class came with the analysis of the Hindu caste system. The differences between ancient social classes and the Indian castes was brought out; but there was apparently no effort to compare them with present-day social classes in Europe and America. Such a comparison would have brought it into the ordinary thinking field of the pupils and stimulated evaluative judgment and initiative.

Such possibilities of tying up history with present-day thought are more frequent in the study of later periods of history and should not be overlooked. History must be made to live. It must stimulate the pupil to original questions and thoughtful comparisons if in after life it is expected to lead him to ground his social thinking upon a sound historical basis.

There were some exceptions to this lack of motivation and application. For example, in one class there was an animated discussion whether or not Peter the Great was a great man. Comparisons were used, and the fact was elicited that Peter could not be judged by present-day standards. Even in this case there appeared to be some anxiety lest the amount of time consumed in really constructive training should cause the class to lose a paragraph giving unimportant facts about the reign of Ivan the Terrible.

Taken as a whole, it may be said that the teaching of the conventional things is excellent. The kind needs some revision, however. All the teachers are college graduates and quite above the average in teaching skill. But some of them are not historically trained and their efforts need better direction. They need a more social point of view—a clearer conception of the practical results that should be accomplished in history teaching. None seemed to have thought out fully—and few history teachers have—the most important purpose of teaching history, or to have realized that the most important history happened yesterday; or, again, that history is a kaleidoscopic procession of unfolding events, not a series of fixed panoramas. As in the grades, a knowledge of the end to be gained, and more independence in teaching the boys and girls what the teacher feels is best for them, rather than a textbook, is the great desideratum. Quality of training rather than quantity of knowledge should be sought, and it can be attained without any loss in quantity of information imparted.

CIVICS.

Civics is taught as a half unit in the second semester of the third year to students in the normal-training course, and may be elected by seniors in other courses. Gitteau's Government and Politics in the United States is used as a text. Observations and conferences indicated that considerable reference work was done. The text seemed a little formidable for a half-year's work, if any initiative was to be left to teacher and pupil.

Yet some initiative was taken, as the writer observed when he came into a class actively interested in a debate to take the place of the following recitation. This debate was asked for by the students, and they were working eagerly on it—a thing not quite so visible in their ordinary work. The question was a good one for debate—prohibition against high license—and arose out of a classroom discussion. Here was motive, a basis in belief, a real situation growing out of environment; consequently energy was lavished, the intensity of effort that educates was being put forth, and the writer is compelled to believe that more civics that is worth while grew out of that debate than from a week of the sort of recitations often found in high schools.

The recitation observed was well planned. There was a distinct effort to make civics vital. Questions were asked calling for knowledge of what is going on in local, state and national government. If knowledge of this kind seemed a little too scarce, it might well be due to past environment rather than recent training. More definite effort to stimulate newspaper and magazine reading would aid in remedying this weakness, and should be applied. Other debates calling for such reading would be helpful, and class visitation to civic institutions should be more frequent.

As in many places, the evil effect of an impending formal examination was visible. An inquiry as to the reason for going two months without a debate, when it seemed so effective, led to the reply that the students had shortly to take the state examination for a certificate; also, that the tests called only for dead information and constitutional facts which useful current information would not provide, and consequently it was necessary, in order to meet the formal test demanded by the state, to conserve time by robbing the students of the privilege of doing both the interesting thing and the one that is a direct preparation for citizenship.

While this handicap is recognized, the writer wishes to urge that as rapidly as possible the course in civics outlined by the Committee on Social Studies of the National Education Association be adopted. This outline is as follows:

I. GOVERNMENT AND PUBLIC WELFARE.

Fully two-thirds of the time should be devoted to this topic. Here the pupil studies those activities of the government which influence his life more frequently than those ordinarily classified under the next topic—government machinery. Here he learns how broad is the work of the government and how intimately it influences the life of the individual. The real meaning of government dawns upon the pupil when he learns of the roads, of the weather, of mineral resources, of labor and commercial conditions, and of many other things too numerous to mention. Non-governmental organizations engaged in work for social improvement should be discussed in connection with the governmental functions to which their efforts are most closely related.

The following topics are suggested: (1) Health and sanitation: Housing, pure food and milk, sewerage, waste disposal, contagious diseases, statistics, medical inspection of school children, health crusades. (2) Education. (3) Recreation. (4) Charities. (5) Correction: Juvenile courts, reform schools, etc. (6) Public utilities: Transportation, light, telephone, telegraph, postal system, water, etc. (7) City planning: Sanitation and beauty.

II. GOVERNMENT MACHINERY.

Local, state, national; legislative, executive, judicial; courts and legal processes; election and political activities, including such topics as initiative and referendum.

III. THE DEVELOPMENT OF GOVERNMENT.

Social psychology, democracy, the family, and other social organizations.

This plan of study ought to call for more initiative than an overworked high-school teacher can be expected to show. But texts based upon this outline will shortly be published, and in the meantime all topics here mentioned should be stressed. And even the persons making out the examination questions will be influenced by the new trend. So a forward movement and a community view are necessary to keep this department in line with progressive education.

ECONOMICS.

No attempt is being made to give economics at present. A course has been given at times in the past, however, and one is being planned in the commercial course for next year. This course should without doubt be given. The teacher of commercial subjects rightfully pointed out that a good practical course in economics could be made more interesting and helpful than the commercial geography the students were then reciting. It should be required in the commercial and industrial courses and be elective in the others.

There are two possibilities of handling economics in the High School. One is to join the work to the history course as an additional social study. This is generally done, and the plan is recommended by the Commission of the National Education Association. But all too frequently it leads to purely industrial history, which should occupy a large share of the time of the American history class, or to an undue emphasis upon abstract theory. The other possibility is to make it a commercial study. This in reality is where it belongs, and the writer believes that the recommendation of the Commission should be revised to that extent. Economics is merely a study of business. There is some danger in having it coupled to the commercial course, because of a tendency there to emphasize accountancy and routine rather than the larger principles and relations of the business world. But economics must be made an applied study to fulfill its proper function. The textbooks of the past have been too theoretical and scientific. Like other studies working their way down through the curriculum from the university, economics still has the academic flavor. But many efforts are now being made to write texts for students rather than for the sake of the science, and better adaptation to high-school needs may be expected. Economics should be and some day will be made the most valuable study in the commercial course, and a practical help in citizen training for all others who elect it.

RECOMMENDATIONS.

In conclusion the writer wishes to endorse most heartily the preliminary recommendations of the National Education Association relative to the reorganization of the high-school course in history, civics, and economics. This committee is made up of eighteen educators interested in this particular work, and they have agreed—something teachers do not always do. They are putting in definite form what progressive teachers along these lines have been thinking and striving for. They represent the vanguard of thought and enlightened planning, and it can be stated with confidence that where they are leading the Leavenworth High School will ultimately follow. The writer wishes to urge with all the vehemence in his power that the course of study be headed that way at once.

This committee proposes to outline the five following units of social studies:

1. Community civics and survey of occupations.
2. European history to 1600 or 1700 (including English and colonial American history).

3. European history since 1600 or 1700 (including contemporary civilization).

4. United States history since 1760 (including current events).

5. Economics and civic theory and practice.

Probably the best reasons for this reorganization of the course will appear in the statement under the heading "The Point of View," which we are quoting entire:

"It is probable that the high-school teachers of social studies have the best opportunity ever offered to any social group to improve the citizenship of the land. This sweeping claim is based upon the fact that the million and a third high-school pupils are probably the largest group of persons in the world who can be directed to a serious and systematic effort, through both study and practice, to acquire the social spirit.

"Good citizenship should be the aim of social studies in the High School. While the administration and instruction throughout the school should contribute to the social welfare of the community, it is maintained that social studies have direct responsibility in this field. Facts, conditions, theories and activities that do not contribute rather directly to the appreciation of methods of human betterment have no claim. Under this test the old civics, almost exclusively a study of government machinery, must give way to the new civics, a study of all manner of social efforts to improve mankind. It is not so important that the pupil know how the President is elected as that he shall understand the duties of the health officer in his community. The time formerly spent in the effort to understand the process of passing a law over the President's veto is now to be more profitably used in the observation of the vocational resources of the community. In line with this emphasis the committee recommends that social studies in the High School shall include such topics as the following: Community health, housing and homes, public recreation, good roads, community education, poverty and the care of the poor, crime and reform, family income, savings banks and life insurance, human rights versus property rights, impulsive action of mobs, the selfish conservatism of tradition, and public utilities.

"Long as the foregoing list is, it is quite apparent that many more vital topics could be added. It is therefore important to understand that it is not the purpose to give the pupil an exhaustive knowledge of any one subject, but rather to give him a clue to the significance of these matters to him and to his community, and to arouse in him a desire to know more about his environment. It is to help him to think 'civically' and, if possible, to live 'civically.' Teacher and pupil must realize that they are studying living things. They must not be content with the printed page. Everything and everybody in the community must be drafted into the service of the boy and girl striving to become an effective part of the 'body politic' and a constructive member of the social group. Companions in the schoolroom and on the playgrounds, workers in philanthropy and reform, government officials and business leaders, voters and laborers of every class, are all material for the classroom and laboratory in the social studies.

"History, too, must answer the test of good citizenship. The old chronicler who recorded the deeds of kings and warriors and neglected the labors of the common man is dead. The great palaces and cathedrals and pyramids are often but the empty shells of a parasitic growth on the working group. The elaborate descriptions of these old tombs are but sounding brass and tinkling cymbals compared to the record of the joys and sorrows, the hopes and disappointments of the masses, who are infinitely more important than any arrangement of wood and stone and iron. In this spirit recent history is more important than that of ancient times; the history of our own country than that of foreign lands; the record of our own institutions and activities than that of strangers; the labors and plans of the multitudes than the pleasures and dreams of the few."

CHAPTER XXXII.

THE RELATIONS OF THE SCHOOL AND THE COMMUNITY.

Walter R. Smith.

THE FUNCTIONS OF PUBLIC SCHOOLS.

THE democratic developments of the nineteenth and early twentieth centuries have undermined the idea that the school is an aristocratic institution. Whether or not the common people embody as large a per cent of talent and genius as the upper classes need not here be discussed because it is no longer doubted that they embody a large enough per cent to justify their education. This would be true even if the training of the exceptional man were admitted to be the highest aim of an educational system.

Present educational theory, however, does not admit that it is, nor is our American educational system based upon that theory. Free, public, compulsory education is domocratic education. It is mass education and must be administered for all classes. An analysis of educational history shows three fundamental lines of development: The first is from the select classes to the masses. The abolition of slavery, the elimination of serfdom and the rise of the laboring classes have made this development necessary. The second is a transition from private and elective to public and compulsory education. The extension of the province of government and of universal suffrage has made this essential. The third is a change from ornamental and leisure-time to useful and work-time education. The struggle for a higher plane of living for all the people has made this development fundamental to our civilization.

The state of advancement of any educational system may be measured by its relation to these three standards, but the test must be specifically applied. An educational system may be open to all and yet not be taken advantage of by all. It may be nominally compulsory and yet not reach all. It may offer useful studies and still not prepare all to elevate their plane of living. And that is exactly the condition of our public schools. They are open to all, yet all do not enter. The law tries to compel all to gain the rudiments of an education, yet 8.4 per cent of our voters are illiterate. Our schools try to be useful, but many students drop out to get a more practical training for advance in the business world.

Other parts of this Survey have dealt with other phases; but this part will be confined to a discussion of the wider outreaches of the schools —the intimacy between the school as at present organized and other community interests. Along no other line do the above-mentioned tests offer less basis for local pride than here; and in no place are there more things remaining to be done. It is the judgment of the whole Staff that there is a wider gap between the Leavenworth Public Schools and the public than in most progressive cities. Certainly it is wider than it need be or than is for the best interests of both the schools and the city. If

the schools are to reach all and to train all for citizenship, and to enable all to earn an honest living, it is necessary for all to get together in closer educational relationships.

In order to deal definitely with the subject it may be well to consider these relations under five heads:

1. School extension work.
2. Public use of the school plant.
3. Relations of school and patrons.
4. The school, the home, and the church.
5. The school and business.

SCHOOL EXTENSION WORK.

Three lines of extension work are being done in many cities. There is need for all of them in Leavenworth. The first one is the offering of graduate electives. This may be done in either of two ways. If facilities were adequate a regular year of graduate work might be organized. It would be too much to expect at present that if the high-school curriculum is reorganized a year be added to each of the various courses. But there are always students who might be willing to take another year of work in order to get certain studies they were unable to elect during the regular course if definite announcement could be made that they would be provided for. This is being done already in the normal-training course, and might be extended with very little cost. The other plan is to allow part-time attendance for special work like domestic science or art, manual training, music, bookkeeping, etc. This has already been done to a limited extent in domestic science, and has been helpful not only directly but indirectly in fostering the parent-teacher associations. One or both of these plans could be expanded and definite provision for extension work could easily be made, thus serving and cultivating a wider public.

NIGHT SCHOOLS.

The second phase of extension work is the establishment of night schools. Night-school work has passed definitely beyond the period of experiment. It has become real. The field was first cultivated by correspondence, business, trade and professional schools. But their success led to a demand for publicly supported courses supplementing school work. In almost every city where such opportunities have been offered the response has been astonishing. Leavenworth's near neighbor, Kansas City, Kan., has a total night enrollment of 2300, and Kansas City, Mo., about 8000.

Night-school work is peculiarly inexpensive because the equipment is already at hand. The buildings and apparatus have been acquired for the day schools. They are also heated, and almost the whole expense is for lighting and teaching. Many teachers are willing to give extra service for very little extra pay. Moreover, night-school work is especially rewardful from the fact that students are in earnest and many of them are struggling with poverty. They have found the need of additional education. Hence the discipline feature is eliminated and the teacher's burden lightened.

Night schools also have a valuable reactionary effect upon day schools. Since the students are in earnest, and since they are more mature, their actual needs are looked after. They have found by experience what is most valuable in education, and by pleading are able to influence the pedantic pedagogue to eliminate the impractical and unnecessary. Leavenworth can afford them for their pedagogical effect upon the day school.

But that is not their most valuable contribution. The schools are paid for by the public, and the public wants to be served. The fact that a boy has to leave day school and go to work is no proof that he is unworthy of a public education. Nor because he makes a mistake and voluntarily quits should he be deprived of advantages if he later desires them. There is nothing sacred in the usual hours for obtaining an education; and if they can be extended at small cost it is abundantly worth while.

Leavenworth is in more need of night schools than most cities of its size. It is a factory town, and the employment the factories offer lures young people to leave school earlier than would the work in less highly organized and mechanized industries. The laboring population is large, and the sons and daughters of laborers drop out of school to add their earnings to the family exchequer. And since the employment they secure is highly differentiated work and may not call for all the kinds of energy youth provides, some can pursue work in a night school without appreciably lowering vitality and still earn their wages.

But the need of night schools is not all theory. Investigations pursued by the High School Boys' Club present facts. A Kansas law provides that a board of education must establish a night school when it is petitioned for by the parents of ten children who desire to take advantage of it. Practically double that number of signatures have been secured, and the night school will doubtless be started next year. If properly organized and advertised, it is sure to be an instantaneous and continuous success.

THE VACATION SCHOOL.

The third line of extension work needed is the vacation school. During three months of the year Leavenworth has over four thousand school children with practically nothing to do. They are not vagrants because society expects little of them. But they have no occupation. In the old days of gardens and elaborate household duties and a home that provided manual training and occupational duties, this was not such a serious thing. But now the father is in the store or office or shop and the mother is busy. The child is free and generally idle.

Several citizens were asked what these four thousand children did. There were two answers: "I don't know"; "They are on the streets." This was evident, even in winter time, because diligent search failed to reveal adequate play spaces. Public parks were absent for the reasons previously stated. As shown elsewhere, the school grounds are mostly small and cramped. Private charity has provided two playgrounds. One man bought the apparatus. A few charitably inclined women raised the money for running expenses. Last season's budget of expenses for these two playgrounds totaled $180. One was adequate in size and equipment but was located in a sparsely settled district; the

other was microscopic. The result was an average daily attendance of about fifty-five children. Where were the remainder of the four thousand?

This showing indicates the vast field open to the Leavenworth schools. Those four thousand children should not be objects of charity. The public not only owes them an opportunity for health-giving play, but it owes them the same opportunities for proper development during vacations that they get at other seasons of the year. It need not, and probably ought not, generally to be the same sort of training; but it ought to be as definitely supervised as during the school year. Wherever this summer work has been undertaken it has at first been tentative, then real; first charitable, then public. Supervised play develops into supervised work that is educational.

This work in Leavenworth should doubtless follow the usual line of evolution. The charitable stage has been useful, but it can not go far. It is to be hoped that this charitable spirit will take the direction of educating the public to the possibility and need of civic control. And the best means of reaching the problem is through the schools. Some of the school grounds are adequate for a beginning. The Morris School ground is large enough and is well located for the purpose. The Maplewood and Sumner grounds are also large enough to be useful, if the "keep off the grass" idea can be eliminated from the latter. No possibilities are in sight in the most "respectable" district, but doubtless a centrally located playground could be obtained. Land for school gardening could be rented cheaply.

One trained supervisor might be obtained by the school board. Assistants ought easily to be obtained for the present from primary teachers located in Leavenworth who would be glad of the training provided by an expert. Plays and games of a competitive and educational sort should be used, but generally the most interesting features come in such things as clay modeling, manual-training work of an ingenious kind, folk dancing, swimming where possible, nature-study trips, and actual gardening for profit. Apparatus and supplies are useful, but wholly secondary to trained supervision. Once undertaken, this work is never abandoned, and year by year becomes more efficient and helpful to the general education of the child.

A less worthy but frequently more appealing motive comes in the effect of vacation work upon delinquency. Wherever supervised play has been tried, it is found that the work of the juvenile court is greatly reduced. Tests in Chicago, Buffalo, Rochester, Washington, New York and many other cities show that the saving in the handling of juvenile delinquency goes a long way toward paying the costs of this supervised play. And properly handled it is only slightly less educative than regular school work.

PUBLIC USE OF THE SCHOOL PLANT.

The second phase of community-school relations is shown in the use made of school property. School buildings are paid for and owned by the public. They are in general centrally located for community purposes. They must be kept heated, and generally are lighted. Extra

expense for janitors' services and incidentals is slight. The school building thus becomes the best place for a community social center.

One looks in vain for any organized social centers in Leavenworth. Not that they are not needed, for the conditions are peculiarly favorable to the accomplishment of a real mission through them. Organized recreations in some parts of town are few. Temptations are numerous. Unsupervised amusements are always dangerous. And every opportunity that can be offered by the home, the church and the school to direct leisure time will not be too many. These are the three organized institutions best fitted to cope with evil influences, and no one of them should be recreant to duty. *Every evening spent in the schoolhouse under proper surveillance is a disqualification for pleasure in the underworld.*

A variety of things can be done to make these evenings worth while. A reading room can be established with books and old magazines that will be gladly donated. Picture shows, talks, civic discussions and debates, literary societies and social evenings can be organized. Parents and young people as well as the children need elevating entertainment and educational stimulus. All these things will tie the public to the schools. They will make discipline easier, and can be used to foster a higher type of local pride and civic responsibility—much needed in Leavenworth. The two schools for colored children and some of the others in the more remote and poorer districts really need these additional advantages for social, cultural and recreational purposes. These things are being done in many places, and the Survey Staff wish to urge that some of these centers be organized in Leavenworth without delay.

RELATIONS OF SCHOOL AND PATRONS.

Four parent-teacher associations, representing six of the schools, have been established during the last year, and others are in prospect. Those in existence are doing good work. Better relations are being established between parents and teachers. Misunderstandings are being ironed out and the home and school are realizing more fully their dependence upon each other. The local associations have their regular monthly meetings, and in addition come together for occasional joint meetings.

Three members of the Staff attended one of these local meetings. Each of the members spoke for a time and then listened to an hour of lively discussion. It was presided over by a member of the Board of Education. Questions of safety from fire, building improvement, closer sympathy and better coöperation between parents and teachers were discussed freely. A specific result of this meeting may be mentioned to illustrate the possible value. A commendable effort is being made through the monthly report card to get parents to grade their children on home conduct. On the back of this card grades on the following points are requested: (1) home study; (2) home duties; (3) obedience.

One parent misunderstood and was incensed with the query, and wrote on the card, "This is my business." But after hearing the discussions and getting the point of view of others, he offered his complete coöperation with the teacher and principal in the future. Such things make the work of both teacher and parent easier and more effective.

This coöperative work also has more remote effects. School equipment and buildings depend upon the citizens' willingness to vote taxes. This willingness in turn depends upon knowledge, and every successful parent-teacher organization brings more fully home to the citizen the needs of the schools. A needed bond issue was voted down half a dozen years ago, although the school's bonded indebtedness was small, because of a lack of this public sympathy and knowledge now being fostered. In the constructive program necessary to put the Leavenworth schools to the front, complete coöperation between citizen and teacher is fundamental and must not be neglected.

THE SCHOOL, THE HOME, AND THE CHURCH.

Another phase of school and community relations is the more vital connection between the school and the home. This relation should not only be sympathetic; it should be organic. Many schools have experimented along this line until a definite coöperative basis has been established. All skillfully directed and eagerly pursued work is educative. Scientific cooking or artistic housekeeping in the home is as valuable as it is in the school—even more valuable in educating the girl for her future duties in life. The same is true of accounting, bookkeeping, manual training or other careful and expert work. There is no reason why they should not be given credit toward graduation in school if cautiously estimated and properly correlated with the school course. Wherever such a practice has been properly carried out it has had the quadruple effect of making the school work more interesting and effective, holding the boy or girl longer in school, elevating the standard of home life, and tying the home more fully to the school.

What is true of this correlation of school and home work is equally true of other institutions, especially the church. It would scarcely be less valuable to the school than it would be to the church to have the Sunday school, Y. M. C. A. and the Y. W. C. A. and the young people's societies of the church linked with the public-school work. It would put more seriousness and effort into the church work; it would put more true Christianity and fellowship into the school work, each benefiting by the influence of the other; and the student would get broader ideas of the oneness of all life and higher ideals of complete living and community responsibility. This coöperation is being carefully worked out at the Emporia State Normal by giving school credit to effectively done work in these institutions. Similar work is already done in several progressive cities. The Leavenworth social atmosphere, as pointed out in the opening chapter of this Survey, is in need of the civic spirit and coöperative effort that might be fostered by cultivating the democracy and fellowship and mutual aid of the school, the home and the church.

THE SCHOOL AND BUSINESS.

The school and the business world have been far too contemptuous of each other. The school has wrapped its mantle of superiority about itself and looked disdainfully upon business as a materialistic affair. The business world has scorned the scholar, pitied his self-abnegation, laughed

at his pedantry, and condemned the impractical schools. Each has gone his way and neglected the other, and both have suffered thereby.

As business becomes more complex it demands young employees of greater training and adaptability. The schools should supply these. But they can not be supplied without the coöperation of the business world with the schools. On the other hand, the schools have suffered from this lack of coöperation because they have been unable to practicalize their work enough to hold the students. The great dropping off between the first and second years of the High School, amounting to 37 per cent in Leavenworth, is largely due to the lack of association of first-year studies with real life. Miss Jean M. Gordon states truly that the cause of the large percentage of students leaving the schools before they have finished the twelve years of work offered, amounting to over 90 per cent, is the schools themselves. Boys and girls, young men and young women, must not only be interested in their studies, but they must be able to see wherein these studies will be useful in life, before they will take them. We older persons, in our supposed larger wisdom, may decide that it would be best for them to pursue a certain course of studies arranged logically and given in a drill-perfect way. But we have found that nearly nineteen out of twenty in the cities of the United States will not do this. In Leavenworth about nine out of every ten are not doing it.

What, then, you may ask, is to be done? Two things at least must be done before any large decrease can be made in this enormous school mortality. The school studies must be brought into closer relations with the office and shop, and the office and shop must be linked with the schools in the actual teaching of the various branches of study.

This is being done by our most progressive school systems in various ways. Credit is given in the schools for outside work done either in business or in other institutions. The commercial course should be arranged so that credit may be given for practical work done in bookkeeping, typewriting, stenography, and clerical work of various kinds. Arrangements may be made with business firms to use advanced students part of the day or week or month while they are in school the remainder. This will give the student some practical apprenticeship experience that will enable him to earn a respectable salary immediately on leaving school.

The industrial course likewise offers large opportunities along this line. Tradesmen, after they have had the experience, are glad to get part-time helpers at little cost. The factories in Leavenworth offer an unusual opportunity for this sort of development. A plan similar to the ones so successfully used in Cincinnati, Boise; Beverly and Fitchburg, Mass.; Lewis Institute, Chicago, and a large number of other schools, might be worked out. The process of tying the school work to the shop should proceed slowly and cautiously, but should none the less be started and developed as rapidly as possible.

For the student who is planning a complete college education and wishes to pursue the old cultural high-school course in preparation for a professional career less needs to be done. In the past the high school has

been arranged largely for him and he has used it. But even Leavenworth has plenty of professional men who failed to take all of the high-school work offered, but would have taken it if it had seemed more practical to them at the time they dropped out. English, mathematics, history and civics, economics, physics, and chemistry—all the old-line studies—should be worked over, are being worked over, to make them applied studies. The civic and industrial and institutional life of Leavenworth is rich in laboratory materials for making these studies real and vital and practical for the student; and the reciprocal effect upon those institutions of turning out large bodies of trained young people who understand the needs and problems of the city would aid in building up a greater and better Leavenworth of the future.

NEED OF AN EMPLOYMENT BUREAU.

One other practical phase of this subject must be mentioned in closing. The High School has as yet no definite organization for aiding its graduates in securing positions. Seventy-nine per cent of them do not go to college. Most of this seventy-nine per cent go to work. An employment bureau can be run from the High School principal's office with little expense. Business firms of the city ought to be, and doubtless would be, glad to favor local talent in securing employees. A record of each graduate's qualifications and the opinions of his teachers regarding his character and industry could be on file. Such an employment agency would be useful to both the graduate and the public, and would secure some of that greater intimacy between the schools and the business world which is so much needed in these days of strenuous competition.

SUMMARY OF RECOMMENDATIONS.

1. That every effort be made to close the wide gap which is quite conspicuous in Leavenworth between the schools and the public.
2. That other students besides those taking the normal-training course be urged to return for a year of graduate work in the High School, to be taken from studies not elected during their undergraduate career.
3. That home-makers and other overage men and women be invited to elect specific work that will aid them to become more efficient citizens.
4. That night schools be organized and adequately provided for, to begin work at the opening of next school year.
5. That in connection with the juvenile court and the cultural and civic clubs of the city, a trained supervisor of playgrounds be employed for the coming summer to organize the people and facilities already at hand, and thus make a real beginning in the use of the summer season as an aid rather than a hiatus in educational work.
6. That social centers be established at the Morris School, the Maplewood School, and such others as can be used. Also that social and industrial centers be established at the Lincoln and the Sumner schools.
7. That every effort be made to maintain permanently the present enthusiastic parent-teachers' associations, and that their work and interest be widely extended.

8. That arrangements be made with business men to use part-time students in the commercial work and with factories and tradesmen to do the same for students in the industrial course.

9. That girls be given school credit for work properly done in the home. That the same privilege be extended to boys where the work may be considered constructively educative. Also that arrangements be made with the churches to establish actual study classes, effectively taught, for which school credit shall be given.

10. That an employment bureau be run from the High School principal's office to secure work for graduates and to enlist the coöperation of the business men of the community in giving the graduates a proper start in the business world.

SOME RESULTS OF THE SURVEY.*

I. PROGRESS TOWARDS IMPROVING THE SCHOOL PLANT OF LEAVENWORTH.

The probability of rebuilding in Leavenworth has been rather remote until within the last year. The parent-teacher associations very generally discussed the question during the school term of last year, 1914-1915. These discussions led to the formation of a central committee composed of two delegates from each school building, which made an estimate of the expenditure considered necessary to remodel every public-school building in the city. This estimate was carried before the school board in the form of a petition. The committee was asked by the board to ascertain the state of public opinion and was assured that the board stood ready to coöperate by calling a bond election whenever public opinion justified such action. The central committee then concluded its labors by calling a mass meeting, the large attendance at which showed the unmistakable interest of the public. This meeting referred the matter of making a full and complete investigation of the school-improvement problem to a carefully selected committee of fifteen citizens. This committee is expected to report in full in the fall of 1915.

From all this it is plain to see that Leavenworth is safely on the road to more modern school buildings. It is readily admitted by the school authorities of the city that, next to the parent-teacher associations of the city, the Survey has been a leading factor in bringing about what change of public opinion exists, and this change is considerable.

II. THE REMODELING OF OUR PRESENT SCHOOL BUILDINGS.

In order to meet the fast growing demands for socialized education, and also the demands for some means for socializing patrons as well as pupils, the Board of Education, a year ago, constructed auditoriums in the larger grade buildings of the city. These auditoriums are in constant use in many group endeavors in school, and are also in use by parents in their local meetings connected with the schools.

Most of the dark rooms of the old-fashioned grade buildings have been rendered tenable by additional windows. The Survey assisted materially here.

The Board of Education is carrying out a plan begun some four years ago of installing one new heating plant each summer until all defective plants have been removed. Three new plants have been installed and only two defective plants remain.

* This account of some of the results of the Survey is appended to the report of the Survey at the suggestion of Superintendent Moore, and was prepared by him in October, 1915. A first draft of the report of the Survey was placed in his hands about July 1, 1914, and later a summary of the report was made accessible to the teachers, the board of education, and, in some degree, to the public of Leavenworth. When comparing the statistical tables given here with the tables contained in the report certain facts should be noted. The test in arithmetic is not the same as the one used in making the Survey; the conditions under which the samples of handwriting were collected are not given; and a different spelling test has been used.—DIRECTOR OF THE SURVEY.

III. PARENT-TEACHER ASSOCIATIONS.

Leavenworth has several parent-teacher associations, all of which show signs of healthy growth and endeavor. Four of these associations were organized in 1913 and the remaining three in the following year. They have without question been the most prominent factor in awakening interest in the schools and in education in Leavenworth. In nearly every instance, the programs and discussions have been practical and helpful. The parents who attend these associations are coming to understand the purposes and plans of the schools, and they show a desire to coöperate in realizing these purposes and plans. The benefits of these associations are measured only in their growth, for the more people the associations contain the more good they will accomplish and do accomplish in bringing the people and the schools together.

Enrollment in the Associations.

Third Avenue	124
Oak Street	115
Morris	108
Maplewood	130
Franklin	74
Sumner	145
Lincoln	95

The Leavenworth parent-teacher associations at present furnish three of the officers of the state organization, the president, corresponding secretary, and one director.

IV. HIGHER STANDARDS FOR TEACHERS.

(*a*) *The City Training Class.*

As a direct result of the Survey, the requirements for teaching in the Leavenworth elementary schools have been raised to a higher standard. For years Leavenworth has prepared most of its grade teachers at home, in what has long been known as the city training class. Some four years ago the normal-training course provided for by state law was taken as the nucleus around which to reorganize the training class for the city. In addition to the regular course required by the state for the normal-training certificate, those members of the normal-training class who desired to become members of the city training class were required to take public school music and a course in arts and crafts. To this was added later a course in physical education. After graduation from this course the pupil-teacher was required to do one year of substituting on constant duty (with regular pay) before becoming eligible for a position as a regular teacher. But this plan allowed the prospective teacher to take the state required junior and senior work in high school, thus permitting her to become eligible for a regular position with really only one year of preparation beyond the high school, namely, the year as a substitute. Since the Survey the board has been able to raise the standard, until now the prospective teacher, before becoming a regular teacher, must meet the following requirements:

1. She must be a graduate of an accredited high school before entering the city training class.

2. She must spend two years in the city training class or in a normal school or college equivalent thereto.
3. She must have a state normal-training certificate or its equivalent.
4. She must possess a city certificate determined upon the following elements:
   (*a*) State certificate multiplied by 40.
   (*b*) Average of daily grades in normal-training class × 20.
   (*c*) Public-school music × 10.
   (*d*) Arts and crafts × 10.
   (*e*) Physical education × 10.
   (*f*) Practice teaching × 10.
5. She must serve one year as a substitute on daily duty, assisting (1) as a teacher when so needed; (2) as office help in the principal's office; (3) as an assistant in making out records, grades, tabulations of school statistics, and in the clerical work connected with tests and measurements; and (4) any other work incidental to teaching which she may be requested to do by the principal or superintendent.

Thus it will be seen that the standard has been raised to a point where three years' preparation beyond high-school graduation is required. Since four years' preparation beyond the high school is all that is required by the North Central Association of Colleges for teaching in accredited high schools, it appears that the present Leavenworth minimum for grade teachers is now as high as one could reasonably expect. It may also be remarked that two years beyond the high school is all that is required for the life certificate by our state normal schools. Measured by this standard, it is again seen that the Leavenworth requirements are above the average.

(*b*) *Improvement of Teachers in Service.*

The teachers of Leavenworth have always carried forward some character of improvement in service work. Being located in easy reach of the State University, the work for some years has consisted of series of lectures from that institution, sometimes academic and sometimes professional in nature. For the last four years the work has been entirely professional in character. Since the Survey the entire corps of grade teachers has been doing extension credit work for the Kansas State Normal School of Emporia, and the results have been used as the basis for advance in salary. This work consists of fifteen lectures or recitations of not less than fifty minutes each, for one hour of credit, provided a satisfactory examination is passed. The lectures are given under rules and regulations prescribed by the Kansas State Normal School and the final examinations are passed upon by that institution.

(*c*) *Attendance of Teachers at Summer Schools.*

The comparative data furnished by the Survey revealed that the grade teachers of Leavenworth were about on the average as to the number of teachers attending summer schools; but from the rapid growth of such schools it is evident that this average is ever increasing, and if the local average did not increase correspondingly the city would soon fall behind in this respect. However well teachers may be trained in the home training classes, it is a matter of supreme importance that each teacher bring

to the schools of the city the breadth of outlook on life and education that teachers in service can obtain nowhere else except in the great educational centers in summer sessions, or, if the means can be afforded, in whole years on leave of absence. Since the Survey—and to a great extent as the result of the Survey— there has been a considerable increase in the number of teachers attending summer schools. In addition, the board of education has been asked in a few cases to grant a year's leave of absence in order that the applicant might pursue special courses in professional schools.

V. The Use of Tests and Measurements.

With the Survey the school authorities of Leavenworth began the use of standard tests for measuring products of instruction in the common branches. The Leavenworth Public Schools are now provided with an expert for making these tests and directing the use of the tabulated results. The results are reported to teachers, principals, and the superintendent. As previously indicated, the Survey has been of material help in initiating this work in the school system. For results of tests in 1914-'15, and up to the present time in the term of 1915-'16. see page 201.

VI. Revision of the Course of Study.

Within the last four years the course of study in the Leavenworth Public Schools has been thoroughly revised and modernized, as has also the method of its administration by the principals and teachers. The teachers are at present engaged in rewriting the course and bringing it into complete correlation and harmony. The results of this serious attempt to adapt subject matter to life as we live it (not as our fathers lived it) has been to increase the school population nearly 8 per cent in a city whose aggregate population is at a standstill. Wherever possible—and that means in nearly every condition and situation—subject matter has been filled with human interest and hitched onto life with actualities instead of supposed cases. For illustration, the children of the city are no longer asked to write compositions with the scrutiny and correction of the teacher as the only motive, but they are offered the same motive that induces the grown-up to write—publication and financial reward. To accomplish this the grade schools maintain a twenty-four-page quarterly publication, folio size, which contains the meritorious compositions of the children (no others accepted). This composition is paid for at so much per word, and every child in the city has a chance to earn money writing for this paper. The writings to be accepted must conform to a certain standard lately set up for measuring composition.

The Use of Tests in the Leavenworth Public Schools.*

COURTIS STANDARD RESEARCH TESTS IN ARITHMETIC, SERIES B, MAY, 1915.

Class Medians.

ADDITION—SPEED.

Grade.	*4th*	*5th*	*6th*	*7th*	*8th*
Standard	5	7	9	11	12
Morris	5	5	6	8	8
Third Ave. ...	5	6	8	8	9
Oak Street ...	4	6	7	7	8
Sumner†	3	8	9	16	13
Maplewood ...	5	6	7	..	..
Franklin	5	7	8	..	..
Jefferson	6	6	..	..	..

ADDITION—ACCURACY.

Grade.	*4th*	*5th*	*6th*	*7th*	*8th*
Morris	50	70	55	50	70
Third Ave. ...	50	60	55	80	70
Oak Street ...	50	60	55	60	70
Sumner†	80	50	50	60	50
Maplewood ...	80	80	100	..	..
Franklin 100		80	60	..	..
Jefferson	70	80	..	..	..

SUBTRACTION—SPEED.

Grade.	*4th*	*5th*	*6th*	*7th*	*8th*
Standard	6	8	10	11	12
Morris	5	7	8	10	11
Third Ave. ...	3	5	7	10	9
Oak Street ...	4	6	7	7	8
Sumner†	8	9	18	22	22
Maplewood ...	5	6	7	..	..
Franklin	5	6	7	..	..
Jefferson	7	7	..	..	..

SUBTRACTION—ACCURACY.

Grade.	*4th*	*5th*	*6th*	*7th*	*8th*
Morris	50	65	75	70	70
Third Ave. ...	50	50	55	75	80
Oak Street ...	50	70	60	65	60
Sumner†	30	50	50	50	80
Maplewood ...	80	80	100	..	..
Franklin 100		80	70	..	..
Jefferson	80	80	..	..	..

MULTIPLICATION—SPEED.

Grade.	*4th*	*5th*	*6th*	*7th*	*8th*
Standard	5	7	9	10	11
Morris	6	6	8	9	11
Third Ave. ...	4	5	7	7	9
Oak Street ...	4	7	7	9	9
Sumner†	3	7	7	7	11
Maplewood ...	4	6	6	..	..
Franklin	4	6	7	..	..
Jefferson	5	7	..	..	..

MULTIPLICATION—ACCURACY.

Grade.	*4th*	*5th*	*6th*	*7th*	*8th*
Morris	60	70	65	60	70
Third Ave. ...	50	100	100	70	70
Oak Street ...	50	60	60	70	70
Sumner†	30	50	50	50	70
Maplewood ...	80	80	100	..	..
Franklin	80	80	60	..	..
Jefferson	80	80	..	..	..

DIVISION—SPEED.

Grade.	*4th*	*5th*	*6th*	*7th*	*8th*
Standard	4	6	8	10	11
Morris	5	6	5	7	9
Third Ave. ...	3	3	5	5	8
Oak Street ...	4	5	5	7	7
Sumner†	3	7	7	11	13
Maplewood ...	3	4	5	..	..
Franklin	3	5	6	..	..
Jefferson	4	4	..	..	..

DIVISION—ACCURACY.

Grade.	*4th*	*5th*	*6th*	*7th*	*8th*
Morris	40	60	70	80	80
Third Ave. ...	50	70	80	90	80
Oak Street ...	50	70	60	75	75
Sumner†	30	50	50	70	80
Maplewood ...	70	70	100	..	..
Franklin 100		80	80	..	..
Jefferson	80	80	..	..	..

STARCH'S READING TEST, 1914-'15.

Measurement of Speed.

The rate is given in words per second.

School.	*3d grade.*	*5th grade.*	*7th grade.*
Standard	2.1	2.8	3.6
Morris	1.5	2.9	3.5
Third Avenue	3.0	3.9	4.3
Oak Street	2.3	4.0	3.5

* These tabulations were made by Ira J. Bright, efficiency expert for the Leavenworth Public Schools.

† Colored school.

VOL. IV. NEW SERIES. No. 6.

KANSAS STATE NORMAL SCHOOL

EMPORIA

THE COST OF INSTRUCTION IN KANSAS HIGH SCHOOLS

BY WALTER S. MONROE, PH. D.,

Professor of School Administration and Director of the Bureau of Educational Measurements and Standards, Kansas State Normal School.

NUMBER 2

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The School.

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Cost of Instruction in Kansas High Schools.*

INSTRUCTION in school subjects is a commodity which communities purchase by employing a superintendent and teachers. This commodity is purchased in the open market with free competition. In return for the monthly salary, the teacher instructs the students assigned to her. The amount of the commodity (instruction) which the community receives depends upon the number of students which the teacher instructs. Other things being equal, the teacher who instructs 50 students is giving to the community only half of the instruction which another teacher gives who instructs 100 students. If the two teachers receive the same salary, the community which employs the first teacher is paying twice as much for a given unit of instruction as the community which employs the second teacher.

Purpose and Method.

The purpose of this investigation was to determine what the cities of Kansas are paying for a unit of instruction in their high schools and what are the important factors in determining the cost. In October, 1914, a questionaire was mailed to all high schools in Kansas which were listed in the Educational Directory of the state superintendent of public instruction as offering a four-year course. In this way the following information was secured from each high-school teacher in 54 first- and second-class cities and 149 third-class cities:

City———— *Name of teacher*———— *Salary per month*————

CLASSES TAUGHT.

Periods	1	2	3	4	5	6	7	8
Subject								
Number of students in class								
Length of period								

The teachers were asked to include all laboratory periods, and, if a class did not meet daily, to indicate the days on which it did meet. Superintendents and principals who taught high-school classes were asked to give their salary per month in full and to furnish the same information as the other high-school teachers.

* The author is indebted to the superintendents and teachers of the state for furnishing the data on which this report is made. He is especially indebted to Mr. F. M. Thompson, now Superintendent of Schools at Horton, Kan., for assisting in making the tabulations.

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Cost Per Student Recitation, in Cents.	Number of students instructed by one teacher.																													Totals.
	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	Above 150.		
1																												1		1
2													3	3	5	3	5	1		1	2	3		5	4	3	1	6		26
3							3		2	1		2	7	3	5	4		1												46
4										6	4	4	2				1	2		2	5		1	2	1	1	1	1		26
5							3	2	2		1																			23
6						4		1	1																					9
7		1		2	2	1	1																							6
8			1		1																									3
9				1																										5
10				1																										1
11				1																										1
12				1																										1
Above 12																														
Totals		1	1	5	3	5	7	3	5	7	5	6	12	6	10	7	6	13	6	3	7	3	1	8	5	4	2	8		149

for instruction. A city in which the high school is so organized that a teacher instructs 80 to 100 students each day may pay relatively high salaries and yet secure instruction at a relatively low price.

TABLE V. Showing the coefficients of correlation of the cost per student recitation with the average size of classes, with the number of students instructed by one teacher, and with the monthly salary of the teacher.

Cities of the first and second class.

Subject.	With average size of classes.	With the number of students instructed by one teacher.	With monthly salary of the teacher.
English	—.608	—.497	.248
Mathematics	—.625	—.555	.186
History	—.563	—.644	.257
Science	—.790	—.741	.402
Agriculture	—.631	—.668	.396
Modern languages	—.722	—.863	.176
Latin	—.720	—.748	.100
Household arts	—.758	—.620	—.072
Manual training	—.705	—.414	.107
Commerce	—.751	—.749	—.068
Normal training	—.700	—.705	.026

TABLE VI. Showing the coefficients of correlation per student recitation with the average size of classes, with the number of students instructed by one teacher, and with the monthly salary of the teacher.

Cities of the third class.

Subject.	With average size of classes.	With the number of students instructed by one teacher.	With monthly salary of the teacher.
English	—.647	—.672	.072
Mathematics	—.758	—.805	.288
History	—.742	—.763	.243
Science	—.713	—.761	.257
Agriculture	—.579	—.615	.102
Modern languages	—.638	—.681	.239
Latin	—.701	—.785	.269
Household arts	—.609	—.535	.096
Manual training	—.727	—.565	.338
Commerce	—.690	—.690	.360
Normal training	—.679	—.665	.099

TABLE VII. Tables showing relation between number of students instructed by one teacher in English and the total high-school enrollment in 144 third-class cities.

Number of Students Instructed by One Teacher.	Total enrollment.																								Totals.
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	
25	1																									1
30		1																								1
35	4	1																								5
40	1	2																								3
45	1	2	1		1																					5
50		4	3																							7
55		2	1																							3
60			3	1																						4
65		1	2	1	3																					7
70		2	2	1																						5
75			1	3	1	1																				6
80			3	1	3	3		1																		11
85					5		1																			6
90			1	2	1	2		1	2		1															10
95					3		1		1	2																7
100				1	1		2	1		1																5
105				3	3	5	1	1																		13
110					1	1	1	1																		4
115					1								1									1				3
120						1	3				1					1										6
125				2							1															3
130						1																				1
135						1		1		1	1	3				1										8
140						1	2	1		1																5
145						2			1				1													4
150								1		1																2
155													1													1
160									1	1																2
Above 160						1	1						1		1	1										5
Totals	7	15	17	15	23	19	12	8	5	7	4	3	4		1	3						1				144

The number of students which may be instructed by a teacher is limited by the size of the school, for in a school with a very small total enrollment the number of students in a class can not be large. To learn how closely the number of students instructed by a teacher depends upon the size of the school, these two items were tabulated together for 144 third-class cities. See Table VII. This table shows that under the present plan of organization the number of students which one teacher may instruct is limited by the enrollment of the high school, but it also shows that in the case of English in schools having the same total enrollment there is a wide range in the number of students instructed by one teacher. For example, take the 15 schools which have an enrollment of 40. The number of students instructed by one teacher ranges from 60 to 125. Since English is a subject required of all students, we must conclude that some of these schools are better organized than others. A teacher can instruct from 100 to 125 students in most subjects, and when a teacher is assigned fewer than 75 students in such a subject as English, she is not rendering the service of which she is capable. When this happens because of poor organization and management, this community is being deprived of its rights.

Tabulations similar to that given in Table VII were made for the other subjects in the case of third-class cities and the coefficients of correlation are given in Table VIII. This table shows that, as in the case of English, there is a close agreement between the number of students instructed by one teacher and the enrollment in the case of mathematics, history, science, and normal training. These subjects, together with Latin, are the staple or required subjects of the curriculum of the small high school in Kansas. (See Table XVIII for the per cent of high schools in which these subjects are taught.) The coefficients for the other subjects, agriculture, modern languages, household arts, manual training and commerce are so small that they indicate little agreement between the number of students instructed by one teacher and the enrollment. This is probably due to these subjects being so-called "electives," and classes are organized upon sufficient demand.

TABLE VIII. Students instructed by one teacher correlated with total high-school enrollment in third-class cities.

English	.709	Latin	.372
Mathematics	.778	Household arts	.258
History	.499	Manual training	.169
Science	.508	Commercial subjects	.516
Agriculture	.263	Normal training	.597
Modern languages	.228		

That the number of students which a teacher instructs is practically determined by the size of the classes is shown by comparing Table IV with Table VIII*a* and by comparing the first and second columns of coefficients of Tables V and VI. Approximately the same degree of correlation exists between the cost of a student recitation and the average size of classes

TABLE VIIIa. Showing relation between cost per student recitation in English and average size of classes in 149 third-class cities.

Cost Per Student Recitation.	Average size of classes.																										Above 27.	Totals.
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
1															2	1			4	3	4	1	4	2	3		1	1
2											1	2	1	6	7	5	5	2	6	2	4	1	4				2	26
3								1		4		5	3	3	4	2		1	1	1			1					46
4						1	1	2	3	5	3	2	4	1		1												26
5							3	2	2		1					1												23
6					1	1		2		1	1																	9
7			1		1	1																						6
8				1	4																							3
9						1	1																					5
10																												1
11					1																							1
12					1																							1
Above 12																												
Totals			1	1	8	4	5	7	5	10	6	9	8	10	13	10	5	3	11	6	8	2	9	2	3		3	149

as between the cost of a student recitation and the number of students instructed by one teacher. It appears then that the ability of the superintendent to organize his school so that the class will be of moderate size is a fundamental factor in determining the price which a community pays for instruction. For, within rather wide limits, the number of students which a teacher will instruct depends upon the organization of the school by the superintendent, and the number of students instructed by a teacher largely determines the price which the community pays for instruction.

The dependence of the cost of a student recitation upon the total enrollment of the high school is shown in another form in Tables XIX*a*, XIX*b*, XX*a*, XX*b* and XX*c*, inclusive. In these tables the cities have been grouped according to the enrollment. The left half of Table XIX*a* gives the distribution according to the cost per student recitation of those cities of the first and second class which have an enrollment below 100; the right half of Table XIX*a* gives the same information for those cities which have an enrollment between 100 and 150; etc. In the case of third-class cities there is a great lack of uniformity in the cost of a unit of instruction in cities having a high-school enrollment below 60, but in general it decreases slightly as the size of the school increases.

Can the small community be relieved from the high cost of instruction? The length of class periods and the number of meetings per week are generally the same for all classes, regardless of the size of classes. The college-entrance requirements are uniform for all sizes of classes. Some small communities are able to secure instruction at a more reasonable rate than others by reason of having their school better organized and managed; that is, by employing a superintendent who is efficient in these respects. But still more relief would come from an organization of the high school which would permit shorter periods or fewer periods per week for small classes. It is reasonable that the members of a class of five to ten students will receive as much instruction in three periods as a class of twenty-five will receive in five periods.

Standards.

If all of the third-class cities were arranged in the order of the cost of a student recitation in English, the cost of a student recitation in the city which is the middle one of the group is called the median cost. Just half of the cities pay more and half of them pay less. The median cost of a unit of instruction has been computed for each subject for each of the two groups of cities. See Tables I and II.

The median cost represents the consensus of present practice, but such a standard would be too rigorous for application to cities in which the high-school enrollment varies widely. More appropriate standards would be the medians when the cities are grouped according to enrollment, as in Tables XIX*a*, XIX*b*, XX*a*, XX*b* and XX*c*. These medians are grouped by subjects in Tables IX and X. For some of the subjects—for example, manual training—the number of cases is so small and so widely distributed that the median is not very reliable. In any case, medians should not be applied too rigorously as standards, because of the power-

ful influence upon the cost of a unit of instruction of the number of students which the teacher instructs. Furthermore, as teachers' salaries increase and as high schools become better organized these medians will change.

The significance of differences in the cost of a unit of instruction becomes more apparent when we consider the cost of 1000 units of instruction. At four cents per unit, 1000 units cost $40. A school with an enrollment of 50 consumes 200 units of instruction daily and 1000 units each week. (This is assuming that each student carries four subjects.) A difference of one cent per unit would make a difference of $10 per week in such a school. When the difference in the cost per unit of instruction is greater than one cent, as is frequently the case, the difference in the cost of 1000 units is proportionately greater.

Since the average size of classes and the number of students instructed by one teacher are such important factors in determining the cost of a unit of instruction, we give in Tables XI, XII, XIII and XIV the distributions and medians for these quantities. Tables XI and XII show that some teachers are overworked and others are not kept busy. Here, again, the medians may be thought of as standards, but must not be applied too rigorously.

TABLE XI. Distribution of first- and second-class cities according to the number of students instructed by one teacher.

Number of Students Instructed by One Teacher.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training
Above 150	4	6	7	4	3	2	.....	.....	.....	9	2
150	3	5	2	1	.....	1	.....	.....	.....	2	1
145	2	.....	3	1	1	1	1	.....	.....	.....	.....
140	3	3	6	.....	2	1	1	.....	.....	1	.....
135	4	6	2	1	1	.....	1	.....	.....	.....	.....
130	5	2	4	.....	.....	.....	1	.....	.....	1	.....
125	5	3	2	1	.....	1	.....	1	1	2	.....
120	2	6	7	2	2	2	1	2	3	2	1
115	2	3	1	3	5	1	.....	.....	.....	3	1
110	6	3	4	6	1	2	3	2	1	1	5
105	4	3	3	1	1	4	2	.....	1	1	1
100	4	7	2	2	.....	2	4	1	1	.....	1
95	3	2	2	5	2	3	6	1	1	2	5
90	2	2	4	4	2	4	4	1	.....	1	3
85	3	.....	.....	3	.....	3	3	.....	.....	.....	1
80	.....	.....	1	6	4	6	4	4	4	2	1
75	1	.....	1	4	2	6	4	2	3	.....	.....
70	.....	3	1	2	2	2	6	4	3	1	2
65	.....	.....	.....	2	2	1	2	4	2	.....	2
60	.....	.....	2	3	.....	1	3	3	6	2	2
55	.....	.....	.....	1	.....	.....	.....	4	1	.....	.....
50	.....	.....	.....	1	3	1	3	4	3	.....	5
45	.....	.....	.....	.....	2	2	1	2	3	2	2
40	1	.....	.....	1	1	1	.....	5	2	1	3
35	.....	.....	.....	.....	2	.....	3	3	3	1	5
30	.....	.....	.....	.....	2	.....	.....	5	.....	.....	1
25	.....	.....	.....	.....	1	.....	.....	1	2	.....	.....
20	.....	.....	.....	.....	.....	1	.....	.....	.....	1	1
15	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....
10	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....
Total	54	54	54	54	43	48	54	50	40	35	47
Median number of students	122	123	124	95	83	90	85	60	65	120	85

TABLE XII. Distribution of third-class cities according to the number of students instructed by one teacher.

Number of Students Instructed by One Teacher.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training
Above 150	8	13	8	2	2	2	1	1	.....	2	1
150	2	3	3	.....	1	.....	.....	.....	.....	1	.....
145	4	3	2	4	.....	.....	1	.....	.....	.....	.....
140	5	7	2	1	1	.....	1	.....	.....	2	.....
135	8	2	3	.....	.....	.....	1	.....	.....	1	.....
130	1	9	4	1	2	1	2	.....	.....	2	.....
125	3	3	2	1	.....	.....	2	.....	.....	1	2
120	7	2	6	1	1	1	.....	1	.....	.....	1
115	3	9	3	2	3	.....	.....	.....	.....	.....	2
110	6	11	6	1	.....	1	2	.....	.....	.....	.....
105	13	6	9	4	2	4	5	.....	.....	2	1
100	6	11	4	2	2	3	11	.....	.....	1	1
95	7	5	7	5	4	1	6	.....	1	1	3
90	10	5	9	10	1	3	5	.....	.....	1	3
85	6	8	5	9	5	5	10	2	1	2	2
80	12	13	10	6	4	3	4	1	2	5	3
75	6	3	9	12	3	8	7	1	1	3	4
70	5	2	8	11	2	7	8	2	1	3	6
65	7	3	2	3	6	7	10	2	1	7	6
60	5	6	7	12	3	2	12	1	.....	2	3
55	3	2	9	7	4	5	8	3	2	.....	1
50	7	5	9	14	4	3	6	2	3	3	7
45	5	7	3	7	6	6	7	3	3	5	6
40	3	3	6	11	5	3	6	3	1	4	11
35	5	3	5	5	6	5	8	9	3	2	6
30	1	3	2	10	4	4	7	4	2	2	5
25	1	2	1	2	1	3	4	5	2	2	4
20	.....	.....	1	2	.....	4	3	3	.....	1	9
15	.....	.....	.....	.....	2	1	.....	2	.....	2	2
10	.....	.....	.....	2	.....	2	.....	1	.....	.....	1
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Total	149	149	145	147	74	84	142	56	23	58	90
Median number of students	94	102	85	68	67	68	68	43	52	69	51

ful influence upon the cost of a unit of instruction of the number of students which the teacher instructs. Furthermore, as teachers' salaries increase and as high schools become better organized these medians will change.

The significance of differences in the cost of a unit of instruction becomes more apparent when we consider the cost of 1000 units of instruction. At four cents per unit, 1000 units cost $40. A school with an enrollment of 50 consumes 200 units of instruction daily and 1000 units each week. (This is assuming that each student carries four subjects.) A difference of one cent per unit would make a difference of $10 per week in such a school. When the difference in the cost per unit of instruction is greater than one cent, as is frequently the case, the difference in the cost of 1000 units is proportionately greater.

Since the average size of classes and the number of students instructed by one teacher are such important factors in determining the cost of a unit of instruction, we give in Tables XI, XII, XIII and XIV the distributions and medians for these quantities. Tables XI and XII show that some teachers are overworked and others are not kept busy. Here, again, the medians may be thought of as standards, but must not be applied too rigorously.

TABLE XI. Distribution of first- and second-class cities according to the number of students instructed by one teacher.

Number of Students Instructed by One Teacher.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training
Above 150	4	6	7	4	3	2				9	2
150	3	5	2	1		1				2	1
145	2		3	1	1	1	1				
140	3	3	6		2	1	1			1	
135	4	6	2	1	1		1				
130	5	2	4				1			1	
125	5	3	2	1		1		1	1	2	
120	2	6	7	2	2	2	1	2	3	2	1
115	2	3	1	3	5	1				3	3
110	6	3	4	6	1	2	3	2	1	1	5
105	4	3	3	1	1	4	2		1	1	1
100	4	7	2	2		2	4	1	1		1
95	3	2	2	5	2	3	6	1	1	2	5
90	2	2	4	4	2	4	4	1		1	3
85	3			3		3	3				1
80			1	6	4	6	4	4	4	2	1
75	1		1	4	2	6	4	2	3		
70		3	1	2	2	2	6	4	3	1	2
65				2	2	1	2	4	2		2
60			2	3		1	3	3	6	2	2
55				1				4	1		
50				1	3	1	3	4	3		5
45					2	2	1	2	3	2	2
40	1			1	1	1		5	2	1	3
35					2		3	3	3	1	5
30					2			5			1
25					1			1	2		
20						1				1	1
15							1	1			
10					2						
Total	54	54	54	54	43	48	54	50	40	35	47
Median number of students	122	123	124	95	83	90	85	60	65	120	95

TABLE XII. Distribution of third-class cities according to the number of students instructed by one teacher.

Number of Students Instructed by One Teacher.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training
Above 150	8	13	8	2	2	2	1	1	.....	2	1
150	2	3	3	.....	1	.....	.....	.....	.....	1	.....
145	4	3	2	4	.....	.....	1	.....	.....	.....	.....
140	5	7	2	1	1	.....	1	.....	.....	2	.....
135	8	2	3	.....	.....	.....	1	.....	.....	1	.....
130	1	9	4	1	2	1	2	.....	.....	2	.....
125	3	3	2	1	.....	.....	2	.....	.....	1	2
120	7	2	6	1	1	1	.....	1	.....	.....	1
115	3	9	3	2	3	.....	.....	.....	.....	.....	2
110	6	11	6	1	.....	1	2	.....	.....	.....	.....
105	13	6	9	4	2	4	5	.....	.....	2	1
100	6	11	4	2	2	3	11	.....	.....	1	1
95	7	5	7	5	4	1	6	.....	1	1	3
90	10	5	9	10	1	3	5	.....	.....	1	3
85	6	8	5	9	5	5	10	2	1	2	2
80	12	13	10	6	4	3	4	1	2	5	3
75	6	3	9	12	3	8	7	1	1	3	4
70	5	2	8	11	2	7	8	2	1	3	6
65	7	3	2	3	6	7	10	2	1	7	6
60	5	6	7	12	3	2	12	1	.....	2	3
55	3	2	9	7	4	5	8	3	2	.....	1
50	7	5	9	14	4	3	6	2	3	3	7
45	5	7	3	7	6	6	7	8	3	5	6
40	3	3	6	11	5	3	6	8	1	4	11
35	5	3	5	5	6	5	8	9	3	2	6
30	1	3	2	10	4	4	7	4	2	2	5
25	1	2	1	2	1	3	4	5	2	2	4
20	.....	.....	1	2	.....	4	8	3	.....	1	9
15	.....	.....	.....	.....	2	1	.....	2	.....	2	2
10	.....	.....	.....	2	.....	2	.....	1	.....	.....	1
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Total	149	149	145	147	74	84	142	56	23	58	90
Median number of students	94	102	85	68	67	68	68	43	52	69	51

TABLE XIII. Distribution of first- and second-class cities according to the average size of classes.

Average Size of Classes.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training
Above 30	.....	1	2	1	3	1	.....	1	.....	1	2
30	.....	.....	.....	2	3	.....	.....	.....	.....	2	.....
29	.....	.....	2	2	.....	.....	.....	.....	.....	.....	.....
28	.....	3	1	1	2	.....	.....	.....	.....	.....	.....
27	4	2	1	1	2	.....	.....	.....	.....	2	.....
26	4	2	2	1	.....	.....	.....	.....	.....	1	.....
25	6	2	5	5	2	1	1	.....	.....	.....	1
24	3	4	3	1	3	1	.....	1	1	.....	1
23	4	5	3	3	3	2	2	1	.....	4	2
22	4	7	6	2	1	1	.....	.....	.....	1	1
21	8	4	4	2	3	2	1	1	1	1	.....
20	4	8	9	4	.....	3	2	4	2	3	1
19	4	4	2	3	1	1	3	4	1	2	1
18	5	3	1	7	3	5	4	1	.....	2	2
17	2	2	4	7	4	2	3	6	3	2	3
16	2	1	1	3	2	2	5	5	6	1	5
15	1	2	5	2	1	6	8	2	3	1	3
14	2	1	.....	1	1	3	5	3	2	2	2
13	.....	.....	1	2	4	7	4	3	2	1	.....
12	1	3	2	.....	1	6	5	6	2	2	2
11	.....	.....	.....	2	1	.....	2	4	4	2	1
10	.....	.....	.....	1	1	1	1	6	5	.....	2
9	.....	.....	.....	.....	.....	1	2	1	5	2	2
8	.....	.....	.....	.....	.....	1	3	.....	3	1	5
7	.....	.....	.....	.....	2	1	2	1	.....	.....	5
6	.....	.....	.....	.....	1	.....	.....	1	.....	1	4
5	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
4	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	54	54	54	53	43	48	54	51	40	35	47
Median size of classes	21.8	21.8	21.5	19.7	18.7	15.7	15.3	15.5	13.5	19.0	14.5

TABLE XIV. Distribution of third-class cities according to the average size of classes.

Average Size of Classes.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training
Above 30	2	2	1	1	2	.....	1	.....	.....	.....	.....
30	.....	2	.....	1	.....	.....	.....	.....	.....	.....	.....
29	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1
28	1	1	1	2	1	1	.....	1	.....	1	.....
27	.....	2	2	1	1	.....	.....	.....	.....	.....	.....
26	3	.....	1	1	1	.....	.....	.....	.....	.....	.....
25	2	6	3	1	2	.....	.....	.....	.....	2	.....
24	9	8	3	2	.....	.....	.....	1	.....	1	.....
23	2	5	1	2	2	.....	1	.....	.....	.....	.....
22	8	3	4	.....	2	1	2	.....	.....	2	1
21	6	6	3	2	.....	.....	2	.....	.....	1	1
20	11	5	11	9	4	1	3	.....	.....	2	.....
19	3	8	7	4	3	.....	.....	.....	.....	1	2
18	5	7	4	9	3	1	5	.....	.....	1	.....
17	10	13	6	2	4	6	13	2	1	1	2
16	13	12	10	11	3	2	4	2	.....	1	4
15	10	6	8	11	3	6	1	3	.....	1	3
14	8	13	10	7	7	7	7	4	2	4	3
13	9	6	8	8	3	8	14	7	2	3	5
12	6	4	11	6	3	7	12	7	4	5	6
11	10	7	10	13	5	7	6	2	1	8	2
10	5	4	8	14	8	2	11	9	5	4	6
9	7	7	5	9	6	5	12	4	2	2	5
8	5	3	12	11	5	5	15	6	2	3	10
7	4	8	4	9	3	7	5	4	2	6	10
6	8	5	5	3	.....	4	6	3	.....	1	8
5	1	3	3	3	1	5	12	.....	1	1	5
4	1	2	2	5	.....	5	6	1	1	4	7
3	.....	1	1	.....	2	2	4	.....	.....	3	8
2	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	1
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	149	149	145	147	74	84	142	56	23	58	90
Median size of classes	16.1	16.5	14.3	13.0	14.1	11.7	11.0	11.5	10.8	11.6	8.6

TABLE IX. Showing the median cost per student recitation in first- and second-class cities grouped according to enrollment.

Subject.	Enrollment.							
	Below 100.		100–149.		150–199.		200 and above.	
	No. of cities.	Median cost.	No. of cities.	Median cost.	No. of cities.	Median cost.	No. of cities.	Median cost.
English	7	4.0	11	3.4	14	3.0	22	3.1
Mathematics	7	5.3	11	3.1	14	3.0	22	3.4
History	7	5.5	11	4.1	14	3.3	22	3.1
Science	7	7.5	11	4.3	14	3.3	22	3.3
Agriculture	4	8.0	10	6.0	12	3.5	16	4.0
Modern languages	6	7.0	9	5.0	13	4.2	20	4.2
Latin	7	9.3	11	4.7	14	5.0	22	5.0
Household arts	6	6.0	10	5.4	13	3.7	21	3.2
Manual training	3	4.0	8	6.0	11	5.8	17	5.5
Commerce	2	7.0	6	4.0	8	3.3	19	3.2
Normal training	3	10.0	11	8.5	14	6.5	19	6.3
Average	7	6.0	10	4.3	15	3.7	22	3.8

TABLE X. Showing the median cost per student recitation in third-class cities, grouped according to enrollment.

Subject.	Enrollment.									
	Below 40.		40–59.		60–79.		80–99.		100 and above	
	No. of cities.	Median cost.	No. of cities.	Median cost.	No. of cities.	Median cost.	No. of cities.	Median cost.	No. of cities.	Median cost.
English	43	6 3	37	4 4	31	3.8	13	3 2	25	3 1
Mathematics	43	9 1	37	5 3	31	4 0	13	4 2	25	3 0
History	39	7 6	37	5.7	31	4 4	13	4.6	25	3 8
Science	41	7.8	37	6.7	31	5.4	13	5.0	25	4 3
Agriculture	14	6.5	12	9 3	16	5 6	8	6.0	24	4 6
Modern languages	16	11.3	24	5 6	16	5.3	10	4.0	18	6 0
Latin	38	8.4	36	5 3	31	5 3	13	5 0	22	4 4
Household arts	5	5 5	6	6 3	11	5.5	9	5.3	24	4 3
Manual training	4	6 0	4	10 0	1	11.5	3	4.5	11	6 0
Commerce	13	11 6	16	8.3	8	7 5	6	5.0	16	4 5
Normal training	18	13 0	20	12.0	16	8 8	9	8.5	24	9 0
Average	43	7 6	37	5.6	31	4.7	13	4 8	25	4 2

By-products of the Investigation.

In Tables XV and XVI distributions of the cities according to the salary per teacher are given. As in the case of the other distribution tables, variation is the dominant characteristic. The relatively high salaries are due to the superintendents and high-school principals, but aside from these there remain wide differences in salaries. The medians represent the consensus of present practice.

It is interesting to note that teachers of English receive less than teachers of modern languages or Latin. There is no reason why a teacher of English should not command a salary equal with teachers of the other subjects mentioned. The difference is probably due to a greater supply of English teachers than teachers of the other subjects. Teachers are "purchased" in the open market and the salaries paid are governed by the law of supply and demand. These tables indicate in what fields the greatest demand exists.

In Tables XVII and XVIII the distributions of these cities according to the per cent of teaching time given to each subject are given. Take, for example, English in the first- and second-class cities. In one city 9 per cent of the total teaching time is given to English, while in another city 26 per cent is given to the subject. The remaining 52 cities range between these two extremes, the median being 15.5 per cent. Some variation can be explained on the basis of differences in local conditions, but these tables furnish striking evidence of the fact that the superintendents and high-school principals of Kansas are far from an agreement as to what the course of study should be.

TABLE XV. Distribution of first- and second-class cities according to teachers' salaries.

Salary.	English.	Mathematics.	History.	Science.	Agriculture.	Modern languages.	Latin.	Household arts.	Manual training.	Commercial subjects.	Normal training.
$180											
175											
170											1
165											
160									1		1
155					1						1
150			1		2		1				1
145											
140		1			1						2
135		1	1								1
130				1	2				1		3
125			2	4			2		1		6
120		3	2	2	3	2	1		1	1	4
115		1			1		2			1	3
110		2	2	2	4	4			3	2	2
105	1	2	1	2	1	1	3		2		
100	1	3	5	6	6	5	2	6	6	7	3
95	4	6	5	9	3	2	1	3	2	3	6
90	5	6	11	13	7	4	6	5	8	3	5
85	7	10	4	6	3	6	9	3	3	3	3
80	12	9	9	7	3	9	11	10	7	2	3
75	17	7	5	2	4	8	7	9	4	10	1
70	6	2	4		1	5	6	11	1	1	1
65		1	1			2	2	2		2	
60	1		1				1	1			
55											
50											
Total	54	54	54	54	42	48	54	50	40	35	47
Median salary	$81.25	$89.00	$91.35	$94.62	$100	$85.00	$85.00	$81.00	$93.13	$90.00	$115

TABLE XVI. Distribution of third-class cities according to teachers' salaries.

Salary.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training
$175											
170											1
165		1			1					2	2
160											
155		1									
150					2						
145			1		2		1			1	
140	1	1	2	3	2				1		3
135		2		1							1
130	1	4	2	3		1	1			3	2
125		5	1	4	1		2				3
120	3	5	6	4	10		2		1	4	3
115		5	4	2	1		2			2	5
110	1	16	10	10	7	1	2		1	12	8
105	1	5	3	7	1						7
100	2	16	7	26	11	7	6		5	5	13
95		7	13	8	1	3	5			1	9
90	3	21	11	16	4	3	6	1	5	3	3
85	10	10	18	22	5	3	5	4	2	4	7
80	30	17	22	15	6	17	28	14	4	3	10
75	36	11	12	15	9	22	32	15	2	8	5
70	31	14	16	5	3	18	24	15	1	3	4
65	20	6	10	4	6	7	18	3	1	4	2
60	8	2	6	2	2	1	6	3		1	2
55	1		1			1	1			2	
50	1						1	1			
Total	149	149	145	147	74	84	142	56	23	58	90
Median salary	$76.94	$93.57	$86.67	$93.44	$100+	$78.41	$78.28	$77.00	$91.25	$100	$101.15

TABLE XVII. Distribution of 54 first- and second-class cities upon the basis of per cent of teaching time given to high-school subjects.

Per Cent of Teaching Time.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training
27		1									
26	1									1	
25											
24	1										
23											
22	1										
21	1	1								1	
20	2	1		4				1		1	
19	2					1		1	1	2	
18	4	4	1	1			1	1		1	
17	6	4	1	1			1	2			
16	6	2		2				4	2	1	
15	6	4	1	1			1	3	4	1	
14	4	4	2	3		1	1	1	1	2	
13	5	11	3	5				5	3	3	
12	7	6	5	3		2	2	7	3	1	
11	5	6	8	7		1	4	1		5	1
10	2	5	4	3		1	5	3	2	1	1
9	1	1	4	5			5	4	5	6	1
8		1	6	6		6	7	7	6	1	1
7			9	5	1	6	7	3	4	3	4
6		1	6	3		10	7	3	4	2	2
5		1	2	4	2	6	9	1	3	1	6
4			2		7	6	2	2	1		15
3				1	17	5	2		1		8
2		1			12	2				2	2
1					2	1					
0					1						
Totals	54	54	54	54	42	48	54	49	40	35	47
Per cent of cities giving instruction	100	100	100	100	78	88	100	90	74	64	87
Median per cent of time	15.5	13.4	9.5	11.0	3.3	6.4	8.0	12.1	9.2	11.4	4.9

TABLE XVIII. Distribution of 149 third-class cities upon the basis of per cent of teaching time given to high-school subjects.

Per Cent of Teaching Time.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training
39	1										
38											
37											
36	1										
35											
34	1	1									
33				2						1	
32											
31	1		1								
30								1		1	
29	1		1	4							
28	2		1	5			1	2			
27	2		1	3			2	1			
26	3	2		1			1				
25	2	2		1			3				
24	4	4	1	5				1			
23	3	2	2	2			1				
22	7	5	1	5			4	1			
21	6	6	8	7		1	1			1	
20	10	5	6	11			3			2	
19	7	8	3	11			5	1		1	1
18	17	12	9	5		2	8	4		1	
17	13	10	7	9			10		2	1	
16	17	16	13	7		5	15	3	2	1	
15	13	14	12	2		2	10	2		2	2
14	13	10	11	13		4	9	3	1		3
13	7	8	9	12	1	3	5	6	1	3	5
12	7	14	13	9	3	5	11	4	2	3	9
11	4	12	7	6	2	6	10	3	1	4	7
10	5	6	6	7	5	4	6	6		2	7
9		5	12	6	8	13	8	10	4	6	14
8	2	5	7	8	8	12	6	4	1	6	11
7		2	4	2	14	6	8	2	3	6	13
6			4	2	12	12	7	2	2	6	11
5			1	1	11	5	4		3	6	3
4			2		7	2	1		1	2	1
3			2	1	2	2	1			3	3
2					1						
1											
Totals	149	149	144	147	74	84	140	56	23	58	90
Per cent of cities giving instruction	100	100	96	98	49	56	93	37	15	38	60
Median per cent of time	17.4	15.9	14.4	16.7	7.3	9.2	14.3	12.2	9.5	9.0	9 3

TABLE XIXa. Showing the relation of the cost per student recitation to size of high school.—First- and second-class cities.

Enrollment below 100.

Cost.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average
Above 30					1							
30												
29												
28												
27												
26												
25												
24												
23												
22												
21												
20							1					
19									1			
18												
17												
16						1						
15											1	
14					1							
13												
12						1						
11							1					
10											2	
9				1		1	3	1				
8	1	1			1			1				
7				2		1		1		1		1
6			2	1			2			1		2
5		3	2			2		1				2
4	2	2		2				1	1			1
3	3	1	3	1	1			1				1
2	1								1			
1												
Totals	7	7	7	7	4	6	7	6	3	2	3	7
Median cost	4.0	5.3	5.5	7.5	8.0	7.0	9.3	6.0	4.0	7.0	10.0	6.0

Enrollment, 100-149.

Cost.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average
Above 30												
30												
29												
28												
27												
26												
25												
24												
23												
22					1							
21												
20												
19												
18												
17												
16												
15											1	
14												
13												
12					1						2	
11									1			
10										1	1	
9												
8					1	2					2	
7				1	1			1	1		3	1
6					1	2	1	1	2	1	1	
5		1	2	1	2	2	3	5	3	1	1	1
4	1	4	4	7	2	1	4	1				6
3	6	6	3	2	1	1	3			3		3
2	4		2			1		2	1			
1												
Totals	11	11	11	11	10	9	11	10	8	6	11	11
Median cost	3.4	3.1	4.1	4.3	6.0	5.0	4.7	5.4	6.0	4.0	8.5	4.3

TABLE XIXb. Showing the relation of the cost per student recitation to size of high school.—First- and second-class cities.

Cost.	Enrollment, 150-199.													Cost.	Enrollment, 200 and above.												
	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average			English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average
Above 30														Above 30												
30														30												
29														29												
28														28												
27														27												
26														26												
25														25												
24														24												
23														23					1							
22														22												
21														21												
20														20												
19														19												
18														18												
17														17												
16														16											1	
15														15												
14														14												
13														13												
12														12												
11														11												
10									1					10					1							
9							1				1			9												
8									2		1			8												
7				1			1	1	1	1	1			7	2					2	2		1		1	
6			1	1	1	3	4	2	1		2			6	2		1		2	5	7	2	3		2	
5	1	2	3	5	2	4	5	3	2	2	2	5		5	1	2	4	3	1	5	8	1	2	3	4	7
4	1	5	5	6	4	5	6	6	1	3	2	8		4	12	5	10	8	3	7	2	12	8	1	3	13
3	5	6	5	2	3	1		2		2	1	1		3	4	9	6	5	4	1	1	6	4		2	1
2	7	7			1					1				2		7										
1														1												
Totals	14	14	14	14	12	13	14	13	11	8	14	14		Totals	22	22	22	22	16	20	22	21	17	10	19	22
Median cost	3.0	3.0	3.3	3.3	3.6	4.2	5.0	3.7	5.8	3.3	3.6	4.7		Median cost	3.1	3.4	3.1	3.3	4.0	4.2	3.2	3.2	5.5	3.2	3.2	3.4

TABLE XXa. Table showing relation of cost per student recitation to size of high school.—Third-class cities.

Cost.	Enrollment below 40.													Enrollment, 40-59.											
	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average	Cost.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average
Above 30						2					1		Above 30												
30										2			30												
29													29												
28													28					1							
27	1										1		27											1	
26				1									26												
25					1	1					1		25												
24													24												
23													23												
22													22											1	
21													21												
20		1					2				1		20										1		
19			1			1				1	2		19											2	
18										1	2		18											1	
17			1	1			1					1	17				1		1	1					
16													16										1	1	
15		2	1	1			1			1			15										1		
14		1	2	1		1		1	1			2	14				1		2					2	
13		1	1	1		1	1			1	1		13				1		1	1					
12	1	2		2			3						12			1		1					1	2	
11	1	3	2	4	1	3	1			2	2		11				2			3				1	
10	1	7	1				3				1	5	10		1	3	2	2	1		2	2	2	
9	5	5	6	4		1	4			1		7	9		2	2	4	3		2		1		1	
8	2	4	3	5	1		5	1			1	4	8	1	2	1	2		3	2			3	1	
7	5	2	5	7	3	3	5					5	7			2	3			5	1		4	2	5
6	8	3	3	5	2		3		1	2		9	6	1	9	6	5		2	2	3		2		8
5	12	9	4	6	1		4	2	1	1		6	5	9	6	8	4	1	5	3	1	1		3	14
4	5	2	3	2	2	1					4	4	4	11	10	7	7	2	8	11	1				9
3	1	1	4	1	2	2	3	1	1	1	1		3	12	5	5	4	2		4					1
2	1		2		1		2						2	2	2	2	1		1	1			1		
1													1	1						1					
Totals	43	43	39	41	14	16	38	5	4	13	18	43	Totals	37	37	37	37	12	24	36	6	4	16	20	37
Median cost	6.3	9.1	7.6	7.8	6.5	11.3	8.4	5.5	6.0	11.6	13.0	7.6	Median cost	4.4	5.3	5.7	6.7	9.3	5.6	5.3	6.3	10.0	8.3	12.0	5.6

TABLE XXI. The cost per student recitation in cents.—First- and second-class cities.

City.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average
Arkansas City	3.2	2.5	3.0	2.8	.....	.....	4.1	.....	.....	.....	11.2	3
Baxter Springs	8.8	8.0	5.4	4.1	.....	12.0	20.0	8.3	.....	.....	.....	7
Belleville	2.9	4.1	3.9	5.2	5.4	5.1	4.5	5.0	6.4	.....	5.1	4
Caney	3.2	3.6	3.0	4.8	3.4	4.2	6.2	2.7	2.8	3.2	7.5	3
Chanute	5.0	4.0	5.1	3.1	3.0	3.4	7.6	.....	.....	.....	5.4	4
Cherryvale	2.8	2.8	2.6	4.1	3.0	3.0	5.3	5.3	.....	.....	3.5	3
Clay Center	2.7	3.3	3.4	2.8	3.8	5.7	2.7	3.5	4.6	1.7	4.6	3
Coffeyville	4.6	4.3	3.8	4.2	6.6	4.8	5.5	2.8	6.9	3.3	5.1	4
Concordia	4.2	3.0	3.7	6.3	.....	5.4	5.7	4.0	4.5	.....	12.2	4
El Dorado	3.1	4.0	2.9	3.8	4.5	3.2	7.8	3.5	7.0	3.1	5.8	3
Emporia	4.4	3.6	4.4	3.8	6.3	5.0	4.9	3.7	4.0	3.7	6.0	4
Eureka	2.3	4.2	3.1	3.3	3.6	4.4	4.8	5.3	7.2	3.6	6.0	3
Fredonia	2.9	3.1	2.2	3.4	.....	.....	4.3	3.1	3.6	.....	4.3	3
Frontenac	4.8	5.2	3.2	6.4	.....	.....	6.8	5.6	2.5	15.0	.....	5
Fort Scott	3.2	3.2	2.3	2.4	2.8	5.9	5.9	4.4	5.1	1.9	4.2	3
Galena	3.1	3.5	3.2	3.6	3.6	3.8	4.5	3.4	.....	2.6	9.7	3
Garden City	3.7	4.6	4.2	4.9	6.4	4.1	9.0	6.1	10.9	4.0	8.0	4
Garnett	3.1	4.0	4.2	3.7	4.9	8.0	4.9	5.2	6.1	.....	6.6	4
Girard	3.0	2.4	2.5	3.4	5.3	4.7	3.0	2.4	2.4	.....	3.3	2
Goodland	2.5	5.2	6.4	7.7	14.0	9.6	11.0	3.3	.....	6.2	10.7	3
Great Bend	3.1	3.9	3.7	3.3	2.2	4.0	5.0	3.1	3.5	2.0	7.6	3
Harper	2.1	3.3	4.3	4.1	4.7	5.1	5.0	5.8	.....	.....	7.5	3
Hays	3.0	5.9	3.3	4.5	.....	5.1	9.9	.....	.....	.....	.....	4
Herington	3.4	5.5	4.1	4.0	7.7	6.1	4.8	6.6	.....	.....	12.3	4
Hiawatha	3.8	3.9	2.9	4.8	5.9	6.0	3.3	5.2	11.0	5.9	10.0	4
Hoisington	4.6	4.8	5.2	9.6	3.8	7.1	9.8	4.1	8.6	.....	19.0	6
Holton	3.1	3.5	3.6	3.3	5.1	3.8	3.2	2.9	.....	3.5	5.0	3
Horton	2.7	2.8	4.0	3.3	3.4	4.6	3.1	3.1	5.6	1.9	10.0	3
Hutchinson	4.8	4.0	4.4	6.0	.....	6.4	5.0	2.9	4.7	3.2	7.4	4
Iola	3.7	3.6	2.9	5.4	4.0	5.1	4.0	3.5	3.3	.....	.....	3
Junction City	2.8	3.5	3.1	3.6	5.8	4.1	5.0	3.3	9.5	2.9	12.0	3
Larned	3.0	4.0	3.6	4.9	.....	3.6	5.9	.....	.....	.....	8.8	4
Lawrence	4.0	3.2	3.1	4.6	.....	3.7	4.4	2.7	2.3	.....	.....	3
Leavenworth	4.7	5.1	4.0	5.3	.....	6.4	6.0	3.3	5.3	3.8	5.7	3
Lindsborg	3.9	4.5	6.4	3.3	8.4	5.4	6.4	7.9	4.6	.....	.....	5
Lyons	3.2	3.2	5.9	4.5	12.0	.....	3.9	7.1	5.9	6.1	12.0	4
Marion	2.6	2.9	4.3	4.0	10.2	2.8	3.6	3.1	6.3	7.6	18.0	4
Marysville	2.5	3.4	2.7	3.4	22.0	.....	4.1	4.3	5.8	3.7	15.0	3
Minneapolis	2.8	2.4	3.4	4.0	3.7	5.1	5.6	3.4	8.6	2.2	6.9	3
Neodesha	3.2	3.8	5.6	5.6	23.0	3.6	7.3	3.8	6.0	6.8	15.0	5
Olathe	3.0	2.7	5.4	4.1	3.0	.....	4.7	2.7	.....	2.4	12.0	4
Osage City	2.6	3.8	5.0	4.3	8.0	2.7	3.5	2.6	5.3	3.5	7.9	3
Osborne	2.3	3.3	2.3	4.4	2.3	3.6	4.3	4.2	7.1	2.9	6.3	3
Oswego	3.0	3.4	3.2	7.5	33.0	16.0	9.3	9.2	.....	.....	10.3	6
Pittsburg	3.4	2.7	3.6	5.7	.....	3.0	6.0	2.7	4.8	5.0	.....	4
Pratt	3.2	2.7	2.9	6.1	10.0	5.5	5.5	4.2	.....	4.1	8.8	4
Rosedale	4.6	4.1	4.8	7.2	6.6	8.2	5.4	5.3	7.5	10.2	8.4	5
Sabeth	2.3	2.7	2.1	2.1	2.8	3.4	3.8	5.6	8.3	3.1	4.9	3
Salina	5.0	4.7	4.8	3.6	4.6	4.2	5.3	3.3	6.1	5.6	4.1	4
Sterling	3.3	2.9	3.9	3.4	2.7	4.2	5.9	4.3	5.5	3.6	9.2	4
Topeka	3.5	2.5	3.3	3.8	2.9	3.1	4.1	3.6	4.5	4.3	5.2	3
Wichita	3.4	2.6	2.8	2.9	.....	3.6	3.8	3.6	4.9	3.5	3.8	3
Winfield	2.4	2.4	2.1	2.3	2.3	2.8	3.1	2.8	4.0	3.8	6.4	3
Yates Center	3.8	3.4	3.3	2.6	1.9	5.2	6.0	3.4	3.3	.....	2.6	3

TABLE XXII. The cost per student recitation in cents.—Third-class cities.

City.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average
Alden	6.06	9.43	7.19	11.00	7.87	7.93	8.54				19.20	8.31
Alma	3.87	4.60	6.71	4.92	6.25	3.90	12.50	3.90			8.54	5.39
Altamount	2.88	2.22	3.33	5.61	7.57	11.50			8.92	2.73		3.00
Alta Vista	3.47	2.97	6.25	4.40	7.35	6.13	7.81			8.77		5.03
Alton	4.11	9.25	9.00	2.99		8.26	5.95			2.68	12.90	5.24
Altoona	2.36	3.59	4.73	7.51			6.66	5.52	6.80	5.64	16.60	5.26
Andover	7.69	8.47	14.00	12.50			8.19					9.86
Attica	3.38	5.58	3.53	6.13		4.90	4.78				14.80	4.87
Atlanta	10.00	10.00	10.70	9.34			7.93					9.65
Augusta	3.84	5.55	5.71	6.49	5.20	7.81	5.37	8.92	4.8	6.17	11.80	5.81
Baldwin	2.45	3.58	2.89	3.73	2.89		3.55	3.63			9.43	3.00
Barnard	3.63	3.12	2.50	6.21		6.25	4.90					3.96
Basehor	7.19	8.84	7.69	8.84	3.39	13.1	5.43			8.40		6.82
Beattie	3.17	2.95	3.67	7.19	6.49		4.14				8.69	4.48
Belpre	6.25	5.78	8.47	8.92	4.71	14.7	10.70					8.00
Beverly	2.77	5.78	2.93	5.74			8.13				4.73	4.00
Blue Mound	2.53	3.20	2.42	9.00			6.21					4.00
Blue Rapids	2.35	2.87	5.55	4.11	7.51	8.92	4.76	8.00		4.31	13.40	4.51
Bonner Springs	2.53	3.44	8.33	5.95		6.06	2.89	5.20				4.13
Bronson	3.30	3.02	5.52	4.83	3.63		3.42				7.00	4.12
Brookville	5.71	9.43			2.99		2.00		3.17	30.80		7.40
Bucklin	2.85	4.08	5.46	7.35	8.92	3.57	8.06	4.16		8.26	8.33	5.29
Buffalo	5.78	4.71	3.71	4.95		5.07	10.00					4.98
Bunker Hill	5.31	5.12	2.13	3.01			8.92		10.90	8.40	19.50	7.76
Burden	4.01	6.53	5.68	9.70		5.07	11.40			15.40	10.50	5.83
Carbondale	2.16	2.53	4.36	2.61		4.36	5.07				5.71	3.46
Centralia	3.38	6.49	5.98	5.61	10.90	6.06	3.11					4.39
Chapman	3.75	3.30	6.09	3.92	10.20	4.25	16.50	3.77	6.45	8.06	7.24	5.18
Chase	6.99	7.09	5.31	6.94	8.33		10.00	8.33		30.40		7.00
Circleville	2.55	4.32	3.81	6.49			4.78					4.18
Clearwater	2.87	4.85	7.57	5.10	7.93		5.81				8.13	4.92
Clyde	3.59	3.59	3.24	5.78			11.10			11.10	4.80	5.01
Colony	4.36	2.98	4.85	11.70	9.17		3.37	4.85			18.50	5.46
Conway Springs	4.48	3.01	3.34	6.41		2.04	11.60					4.08
Courtland	5.55	5.64	9.34	7.93		9.90	5.88					5.00
Cunningham	4.01	4.09	4.90	10.70		5.34	9.70			7.19		5.85
Delphos	3.49	4.54	4.54	5.23	5.88	3.84	3.12	7.14			8.62	5.00
Dexter	5.00	3.44	10.70	5.26		4.67	4.01					5.18
Dighton	3.89	5.20	4.73	3.95	3.20		8.00				7.75	4.91
Effingham	3.92	2.91	2.88	3.44	4.38	5.88	4.95	3.75	4.65	2.47	5.61	3.00
Ellis	5.00	6.80	8.13	13.50	4.71	10.80		6.75	9.52	16.60	10.20	7.51
Elwood	11.40	20.70	11.50	26.00			20.00				52.00	17.60
Ellsworth	4.08	2.61	4.48	6.09	2.51	6.09	4.56	3.21	5.18		9.43	4.27
Enterprise	4.25	8.84	6.25	4.76		8.13	11.00				5.10	6.61
Ekridge	3.73	4.90	3.89	3.86	9.25	7.14	4.65	4.67			3.92	4.18
Fairview	5.68	6.89	6.25	6.02	10.00	5.20	4.95	6.94			12.50	6.49
Florence	3.63	2.63	8.84	6.49	6.49		4.60			2.83		3.96
Formoso	3.67	5.95	5.23	6.80	3.27		7.81				10.30	5.28
Fowler	4.85	3.93	2.77	8.33		4.40	3.08			3.02		4.05
Frankfort	2.68	2.80	5.15	3.09	3.89		3.31	1.85		2.43	9.61	3.21
Garden Plain	7.29	12.30	7.51	11.50			8.92				13.20	9 36
Gardner	3.03	3.48	3.78	3.98		3.77	5 78			3.77		3.74
Glasco	4.14	3.32	3.17	4.48			3.49					3.69
Glen Elder	5.68	4.80	10.80	6.06		4.20	8.92		5.12		22.90	6.28
Goddard	9.90	10.60	8.62	7.69			17.80				8.62	9 66
Greensburg	4.01	4.14	5.58	8.13	4.69	5.71	4.58	6.41	10.50		10 70	5.43
Hamilton	3.07	4.16	4.85	8.47		4.80	5.37					4.85
Hanover	6.71	4.14	9.25	9.25	7.93	7.81				18.60	27.70	8.71
Hartford	3.08	2.73	4.87	3.13	3.06	3.77	4.18	9.80			6.80	4.00
Havensville	1.80	4.16	3.02	4.11			4.62					3 39
Hill City	2.74	2.67	4.16	6.36	2.25	3.20	11.00	5.29	5.84	4.23	4.76	3 84
Howard	2.68	3.95	3.52	2.40	6.36		1 95	4.46	8.84	19.20	9.61	3 88
Hugoton	5.05	3.93	3.46	15.00			4.92					5 76
Irving	5.95	9.17		7 57			5.68			5.20	4.16	6.97
Jamestown	5.98	6.06	3.49	4.08		4.67	4.85			7.24		4.99
Kensington	5.26	5.26	6.17	4.36	3.73		2.32					4 58
Kipp	12.40	10.00	9.00	5.00		11.10	20.70				11 80	10.40
Kirwin	3.33	3.86	3.98	9.09			3.75					3.93

TABLE XXII—CONTINUED.

City.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average
Lansing	4 38	4 87	5.00	5 55	.....	5.74	5.40	4.31	.....	.....	.....	5 00
Lecompton	5.02	6 62	5.81	6.49	5.37	.....	4 27	.....	.....	13.30	.....	5 9[illegible]
Leon	3.03	3.93	4 58	6 66	7.04	.....	6.25	13.80	.....	.....	8.00	5 64
Leoti	4.62	6.62	5.20	9 09	.....	.....	7.81	.....	.....	19.40	.....	6 85
Lewis	6.99	10.20	7.09	7.75	.....	40.00	13 10	.....	.....	.....	12.00	9 24
Liberal	3.86	3.57	4.11	3 90	3.62	.....	5.31	3 83	.....	5.81	9.34	4 06
Little River	3 61	4 80	3.46	3.55	3.62	.....	5.64	.....	.....	3.32	.....	4 00
Lovewell	3.67	15.80	3.63	5.02	6.13	.....	.....	5.10	6 17	3.70	.....	4 93
Lyndon	2.24	3.20	2.72	4 76	8.84	5.61	3.26	.....	.....	7.69	10.50	4 15
Maize	5 34	6 36	4.42	7.40	9.25	4.73	1.66	6.25	.....	.....	9.43	6 66
Mankato	3.02	3 26	1 91	2.63	5.61	4.76	.....	5.00	.....	.....	4.44	3 69
Maple Hill	5.78	11 30	9.34	7.35	.....	3.46	7 40	5.20	.....	11.30	.....	7 00
McLouth	5 78	5 52	8.06	4 23	.....	5.29	4 50	.....	.....	.....	.....	5 45
Medicine Lodge	3.46	3.12	3 63	9.52	4.76	8.19	4.46	6.25	.....	7 81	6 36	5.05
Meriden	3.40	3.70	4.40	6 30	.....	4.80	6.10	.....	.....	.....	.....	4 05
Moline	4 54	2 42	8 40	5.74	8.77	.....	4.67	4 65	.....	3.71	11.90	4 00
Mound City	2 17	4 08	4.27	2.57	2.25	.....	1 59	3.37	.....	.....	12.40	3 00
Mound Valley	3 49	5.23	6.57	5.68	.....	.....	4.29	.....	.....	.....	7.46	5.00
Mt. Hope	5 00	4 46	5.61	7.21	7 69	4.80	3.10	.....	.....	.....	8 00	5 45
Mulvane	3 27	3 03	6.62	4 62	3.70	.....	3.92	.....	.....	.....	14 20	4 80
Muscotah	4.25	5.43	13.20	17 90	.....	.....	5.23	.....	.....	.....	.....	5 00
Natoma	4.38	6.62	4.97	10.50	.....	11.00	4 16	6.25	.....	.....	.....	5.76
Neosho Falls	3.83	4.09	9 25	9.00	28.30	14.5	7.29	6.45	10.00	8.33	11.00	7 00
New Ulysses	8.13	8.77	9.73	11.90	.....	.....	6.99	.....	.....	.....	18.40	9.06
Norwich	4.60	6.41	4 48	11.00	.....	5.29	7.19	.....	.....	10.00	.....	6.00
Oneida	5.88	9.80	7.81	8.40	.....	7.14	12.50	.....	.....	15.00	.....	8.00
Oskaloosa	4.30	4 20	2.80	3.20	4.90	17.00	4.40	7.20	.....	.....	6 40	4.00
Oxford	4.21	10.80	5.31	14.10	.....	8.69	4.80	.....	.....	.....	.....	6.00
Palco	5.64	5.71	6.66	11 50	.....	.....	5.31	.....	.....	.....	4.42	6.00
Plainville	3.96	3.25	4.40	3.73	9.25	.....	4 62	5.15	.....	.....	6.80	4 00
Pleasanton	3.63	6.45	4.09	3.12	2.68	5.98	4 29	3.96	4.14	.....	6 66	4 00
Peabody	3.92	3.07	3.66	5.68	6.84	5.84	3.70	4.31	8.00	5.55	11.50	4 86
Perry	3.19	2.88	5 49	7.75	12.90	6.80	7 69	5.55	.....	.....	.....	5 66
Potwin	4 34	10.10	6.09	6.25	.....	11.50	12.50	.....	.....	.....	10.00	7 00
Portis	4.87	5 71	3.75	17.10	5.34	.....	4 71	.....	.....	7.14	.....	5.60
Protection	5.12	9.43	4.44	4.25	.....	17.50	7 14	.....	.....	20.00	14.00	6.00
Quincy	5.00	8 19	4.58	5 61	4.31	4.83	6.13	.....	.....	.....	.....	5 00
Ramona	4.34	5.07	2.63	12.50	.....	13.00	7.14	.....	.....	6 66	20 20	6 00
Randall	4.03	6.36	5.23	4.65	.....	.....	8.19	7.75	.....	6.75	5.84	5 00
Ransom	8.84	4.38	10.70	7.63	4.87	.....	6.89	.....	.....	.....	8.84	7.00
Reading	3.75	3.69	4 65	5.74	.....	.....	4.42	.....	.....	.....	7.14	4.05
Republic	3.05	3.05	6.45	4.52	.....	.....	3.57	.....	.....	7.40	19.30	4 80
Rock Creek	8.92	14.20	7.69	14.20	.....	.....	10.60	.....	.....	.....	.....	10 70
Rush Center	9.52	11.60	17.10	.....	25.10	.....	15.50	.....	14.20	.....	.....	14 00
St. John	3.95	5.68	5.81	7.14	4.44	11.40	15 00	4.04	8.33	9.43	20.00	7 62
St. Marys	9.90	10.00	9.52	9.70	11.50	.....	9.52	.....	.....	11.40	.....	10.16
Savonburg	7.51	15.10	8.26	8.00	.....	25.10	9.34	.....	.....	.....	18.60	10.06
Sawyer	6.41	4.90	4.90	7.40	3.71	.....	12.70	.....	.....	.....	19.50	6.00
Scandia	6.94	9 25	5.29	6.53	.....	19.30	6.94	.....	.....	.....	.....	6 00
Scott City	3.54	2 68	4.03	6.17	5.18	11.00	4.60	4.25	11.40	.....	10.70	5 00
Sedan	3.23	3.75	3.69	5.18	.....	3.67	3.47	.....	.....	4.60	5 78	4 00
Sharon	4.67	6 99	5.00	3.75	.....	14.30	17.80	.....	.....	12.30	16.40	7.00
Sharon Springs	3.33	4.87	12.20	4.29	.....	4.58	11.50	.....	.....	6.02	8.69	5 02
Spivey	6.41	4.25	6.25	3.52	.....	4.46	4 65	.....	.....	.....	27.60	5.60
Solomon	4.42	6.36	2.84	3.95	.....	13.40	5.23	5.95	.....	3.84	.....	4 66
Stafford	3.41	3.77	3.14	3.93	3.58	4.62	4.71	4.60	5.37	5.05	5 81	4 00
Stockton	2.67	2 43	4.01	4.46	8.06	.....	5.44	2.85	3.57	.....	3.53	3 60
Summerfield	2.77	4.42	3.12	2.30	.....	.....	2.84	.....	.....	.....	.....	3.00
Sylvan Grove	7.93	8.47	.....	4.56	6.09	.....	8.26	.....	5.64	.....	3.86	6.00
Sylvia	6 25	7.04	15.50	3.71	.....	.....	.....	.....	.....	6.45	.....	5.00
Thayer	2.42	3.11	2.85	5.71	.....	7.51	5.88	6.25	.....	.....	14.50	4 05
Tonganoxie	2.80	2.50	4.70	2.70	3.30	4.20	4.20	3.20	.....	.....	4.30	3 00
Toronto	3.78	5.78	7.51	4.11	5.88	.....	4.48	7.51	.....	13.00	.....	5.00
Troy	2.89	2.46	3.20	5.12	2.84	.....	.....	4.31	.....	6.62	5.55	3.70
Turon	27.70	10.30	19.00	8.26	.....	3.90	.....	.....	.....	.....	25.90	9.00
Udall	7.51	5.31	3.33	6.49	.....	11.60	11.60	14.60	.....	.....	.....	7.60
Utica	9.43	12.20	14.30	7.93	.....	.....	7.81	.....	.....	.....	.....	10.02
Valley Center	3.93	5.20	4.52	6.28	.....	4.69	7.35	4.16	.....	7.87	11.20	5 12

TABLE XXII—CONCLUDED.

CITY.	English	Mathematics	History	Science	Agriculture	Modern languages	Latin	Household arts	Manual training	Commercial subjects	Normal training	Average
Valley Falls	2.30	2.80	3.90	4.20	4.80	15.10	4.80	6.80	.....	.....	12.50	4.00
Vermilion	5.78	6.66	4.80	5.58	.....	.....	9.34	.....	.....	.....	.....	6.00
Waldo	5.58	11.00	11.00	8.47	.....	.....	.....	3.57	.....	9.43	.....	6.00
Walnut	3.75	4.52	5.05	3.12	.....	2.84	13.00	.....	.....	.....	.....	4.00
Wamego	2.79	1.99	3.30	5.02	7.75	11.10	5.78	4.03	.....	3.05	16.60	4.00
Washington	2.08	4.34	2.71	3.04	.....	3.75	2.68	2.94	.....	3.84	6.99	3.00
Wathena	2.63	2.46	3.14	4.85	6.84	3.26	11.00	11.70	.....	.....	9.34	4.00
Wetmore	3.66	4.62	4.78	5.58	3.12	.....	6.06	.....	.....	.....	7.81	4.00
Wilson	2.84	5.81	5.10	6.17	4.11	.....	3.92	5.49	.....	.....	15.00	5.00
Winchester	3.10	4.30	4.50	4.90	.....	7.40	3.70	.....	.....	.....	.....	4.00
Winona	9.25	13.60	.....	17.30	.....	32.10	9.25	.....	.....	.....	11.60	14.00
White City	4.08	4.65	7.93	10.10	9.25	.....	2.77	.....	.....	.....	.....	5.00
Woodson	4.21	5.84	3.16	5.34	7.24	.....	4.46	.....	.....	.....	4.83	4.00

~~Educ R 400,9,10~~
~~Educ 26,6,37~~
Educ P 380.7 (3)

Vol. IV. NEW SERIES. No. 7.

KANSAS STATE NORMAL SCHOOL

EMPORIA

THE KANSAS SILENT READING TEST

BY F. J. KELLY, Ph. D.,

Director of the Training School, Kansas State Normal School, and Dean Elect, School of Education, University of Kansas, Lawrence.

NUMBER 3

STUDIES BY THE BUREAU OF EDUCATIONAL MEASUREMENTS AND STANDARDS

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Scientifically devised tests are necessary for the measurement of the results of instruction and the establishment of standards. The Bureau of Educational Measurements and Standards is glad to publish this account of the derivation of the Kansas Silent Reading Tests by Dr. F. J. Kelly, a member of the Bureau, and to have it represent one phase of the work of the Bureau.

WALTER S. MONROE, *Director*,
BUREAU OF EDUCATIONAL MEASUREMENTS AND STANDARDS,
KANSAS STATE NORMAL SCHOOL,
EMPORIA, KANSAS.

NOVEMBER 16, 1915.

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ACKNOWLEDGMENTS.

A piece of work such as deriving a standard test depends upon the coöperative effort of a large number of people. Scores of teachers and thousands of children gave of their time and labor. This I hereby gratefully acknowledge. Unusual appreciation must be expressed to the following superintendents and principals whose active interest in the work made possible the completed test, and to officials of the state who provided clerical help and the free use of the state printing plant:

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Supt. Gordon A. Bailey.
Supt. N. A. Baker.
Supt. D. A. Baugher.
Supt. John F. Bender.
Supt. C. C. Brown.
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Supt. O. J. Silverwood.
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Supt. Armon P. Vaughn.
Supt. E. W. Wells.
Supt. C. M. Ware.

Part I.

The Kansas Silent Reading Test and the Standard Scores of 9,252 Kansas Children.

THE lateness of the completion of the test, in May, 1915, prevented a larger number of superintendents from giving the test before the close of the school year. It seems best, however, to publish the results of the test as given in nineteen cities without further delay, in order that for the opening of school in September, 1915, other superintendents may see what standards were attained by these nine thousand children. Even though the numbers are too small to be considered standards for the several grades in Kansas, it will be found, nevertheless, that the median scores will not be changed greatly by the addition of the scores of other thousands of children. These nineteen cities include a very good random sampling of the large and small cities and of the cities varying widely in all conditions which influence education. We, therefore, give the three tests as they were used in these Kansas schools and the results achieved by children of the several grades.

Test I.	State Normal School, EMPORIA, KAN. Bureau of Educational Measurements and Standards.	Put Pupil's Score Here.

THE KANSAS SILENT READING TEST.

Devised by F. J. Kelly

FOR

Grades 3, 4 and 5.

City..... *State*..... *Date*.....

Pupil's Name..... *Age*..... *Grade*.....

School..... *Teacher*.....

Directions for Giving the Tests.

After telling the children not to open the papers, ask those on the front seats to distribute the papers, placing one upon the desk of each pupil in the class. Have each child fill in the blank spaces at the top of this page. Then make clear the following:

Instructions to be Read by Teacher and Pupils Together.

This little five-minute game is given to see how quickly and accurately pupils can read silently. To show what sort of game it is, let us read this:

> Below are given the names of four animals. Draw a line around the name of each animal that is useful on the farm:
>
> cow tiger rat wolf

This exercise tells us to draw a line around the word cow. No other answer is right. Even if a line is drawn *under* the word cow, the exercise is wrong, and counts nothing. The game consists of a lot of just such exercises, so it is wise to study each exercise carefully enough to be sure that you know exactly what you are asked to do. The number of exercises which you can finish thus in five minutes will make your score, so do them as fast as you can, being sure to do them right. Stop at once when time is called. Do not open the papers until told, so that all may begin at the same time.

The teacher should then be sure that each pupil has a good pencil or pen. Note the minute and second by the watch, and say, BEGIN.

Allow exactly five minutes.

Answer no questions of the pupils which arise from not understanding what to do with any given exercise.

When time is up say STOP and then collect the papers at once.

Value 1.2.	**No. 1.** I have red, green and yellow papers in my hand. If I place the red and green papers on the chair, which color do I still have in my hand? _____
Value 1.2.	**No. 2.** Think of the thickness of the peelings of apples and oranges. Put a line around the name of the fruit having the thinner peeling. apples oranges
Value 1.4.	**No. 3.** Three words are given below. One of them has been left out of this sentence: I can not —— the girl who has the flag. Draw a line around the word which is needed in the above sentence. red see come
Value 1.4.	**No. 4.** There are seven boys and twelve girls in a room. If there are more boys than girls, write boys on the line below. If more girls than boys, write girls on the line below. _____
Value 1.6.	**No. 5.** If you would rather have a dollar than a little stone, do not put a line under dollar, but if you would rather have five dollars than a pencil, put a line under stone. dollar stone
Value 1.7.	**No. 6.** The first letter in the alphabet is "a." Below are some words containing the letter "a." Draw a line under the one in which the first letter of the alphabet is found the greatest number of times. hat easy baby age alas manfully

Value 1.8	**No. 7.** A child wrote these letters on the blackboard, b y a k. He then rubbed out one letter and put c in its place. He then had b y c k on the blackboard. What was the letter which he erased? _____
Value 1.9.	**No. 8.** Count the letters in each of the words written below. You will find that pumpkin has seven letters, and thanks has six letters. One of the words has five letters in it. If you can find the one having five letters, draw a line around it. breeze thanks yours pumpkin duck
Value 2.0.	**No. 9.** Here are some names of things. Put a line around the name of the one which is most nearly round in every way like a ball. saucer teacup orange pear arm
Value 2.1.	**No. 10.** A recipe calls for milk, sugar, cornstarch and eggs. I have milk, sugar and eggs. What must I get before I can use the recipe? _____
Value 2.2.	**No. 11.** We planted three trees in a row. The first one was nine feet tall and the last one was three feet shorter than the first one. The middle one was two feet taller than the last one. How tall was the middle one? _____
Value 2.2.	**No. 12.** Below are three lines. If the middle line is the longest put a cross after the last line. If the last line is the longest, put a cross after the first line. If the first line is the longest put a circle in front of the middle line. _____ _____ _____

Value 3.1.	**No. 13.** Three men have to walk to a town ten miles away. Each man carries a load. The first carries 25 pounds, the second 30 pounds, and the third 40 pounds. The heavier the load the slower the man travels. In order that they may arrive in town at the same time, which man must start first?
Value 3.5	**No. 14.** My house faces the street. If a boy passes my house going to school in the morning, walking toward the rising sun, with my house on his right hand, which direction does my house face?
Value 4.8.	**No. 15.** Fred has eight marbles. Mary said to him: "If you will give me four of your marbles, I will have three times as many as you will then have." How many marbles do they both have together?
Value 8.9.	**No. 16.** If in the following words e comes right after a more times than e comes just after i, then put a line under each word containing an e and an i; but if e comes just before a more often than right after i, then put a line under each word containing an a and an e. receive feather teacher believe

Test II.	State Normal School, EMPORIA, KAN. Bureau of Educational Measurements and Standards.	Put Pupil's Score Here.

THE KANSAS SILENT READING TEST.

Devised by F. J. Kelly

FOR

Grades 6, 7 and 8.

City..... *State*..... *Date*.....

Pupil's Name..... *Age*..... *Grade*.....

School..... *Teacher*.....

Directions for Giving the Tests.

After telling the children not to open the papers ask those on the front seats to distribute the papers, placing one upon the desk of each pupil in the class. Have each child fill in the blank spaces at the top of this page. Then make clear the following:

Instructions to be Read by Teacher and Pupils Together.

This little five-minute game is given to see how quickly and accurately pupils can read silently. To show what sort of game it is, let us read this:

> Below are given the names of four animals. Draw a line around the name of each animal that is useful on the farm:
>
> cow tiger rat wolf

This exercise tells us to draw a line around the word cow. No other answer is right. Even if a line is drawn *under* the word cow, the exercise is wrong, and counts nothing. The game consists of a lot of just such exercises, so it is wise to study each exercise carefully enough to be sure that you know exactly what you are asked to do. The number of exercises which you can finish thus in five minutes will make your score, so do them as fast as you can, being sure to do them right. Stop at once when time is called. Do not open the papers until told, so that all may begin at the same time.

The teacher should then be sure that each pupil has a good pencil or pen. Note the minute and second by the watch, and say, BEGIN.

Allow exactly five minutes.

Answer no questions of the pupils which arise from not understanding what to do with any given exercise.

When time is up say STOP and then collect the papers at once.

Value 1.0.	**No. 1.** The air near the ceiling of a room is warm, while that on the floor is cold. Two boys are in the room, James on the floor and Harry on a box eight feet high. Which boy has the warmer place? _____
Value 1.3.	**No. 2.** If gray is darker than white and black is darker than gray, what color of those named in this sentence is lighter than gray? _____
Value 1.6.	**No. 3.** We can see through glass, so we call it transparent. We can not see through iron, so we call it opaque. Is black ink opaque, or is it transparent? _____
Value 2.0.	**No. 4.** My shepherd dog can run faster than any of my father's large herd of cattle, but he will not chase a rabbit because he learned long ago that a rabbit could easily outrun him. If my dog is no slower than other shepherd dogs, draw a line under the fastest runner of the three animals named below. rabbit shepherd dog cow
Value 2.2.	**No. 5.** If you find a word in this sentence which may be used to denote color, draw a line under it, but if you do not find such a word, draw a line under the first word of the sentence.
Value 2.3.	**No. 6.** In going to school, James has to pass John's house, but does not pass Frank's. If Harry goes to school with James, whose house will Harry pass, John's or Frank's? _____
Value 2.4.	**No. 7.** A boy goes to school in the morning, goes home at noon for lunch, returns to school at 1 o'clock, and returns home at 4 o'clock. How many times does he travel between home and school that day? _____

Value 2.6.

No. 8.

Here are two squares. Draw a line from the upper left-hand corner of the small square to the lower right-hand corner of the large square.

Value 3.0.

No. 9.

A farmer puts one-half the hay from his field into the first stack, then two-thirds of what is left into a second stack, and the remainder into a third stack. Which stack is the largest?

_____

Value 3.9.

No. 10.

Below are two squares and a circle. If the circle is the largest of the three, put a cross in it. If one square is smaller than the circle, put a cross in the large square. If both squares are smaller than the circle, put a cross in the small square.

Value 4.0.

No. 11.

"The curfew tolls the knell of parting day,
The lowing herds wind slowly o'er the lea,
The ploughman homeward plods his weary way,
And leaves the world to darkness and to me."—*Gray.*

Study the above quotation carefully. The author lets us know his feeling about the coming of night. If you think his feeling is one of fear and dread, underscore curfew. If his feeling is one of peace and gladness, underscore ploughman.

Value 4.0.

No. 12.

Read these carefully:

Bears are larger than bugs.
Houses are larger than bears.
Mountains are larger than houses.
Then bugs are not as large as mountains.

I have tried to make no false statement among these four. If I have succeeded, underline the word success. If I have failed, underline the word failure.

success failure

Value 4.3.	**No. 13.** If a man takes an hour to walk around a square, each side of which is a mile in length, how long will it take him to walk eight miles? _____
Value 4.9.	**No. 14.** A list of words is given below. One of them is needed to complete the thought in the following sentence: The roads became muddy when the snow ———. Do not put the missing word in the blank space left in the sentence, but put a cross below the word in the list which is next above the word needed in the sentence. water is melted snow
Value 5.8.	**No. 15.** I am writing this paragraph to test your ability to read what I compose. Underscore any word in the paragraph which has the same number of letters as the third word from the beginning of the paragraph, but which has none of the same letters.
Value 10.2.	**No. 16.** My mother's birthday and mine are on the same day. We always have a round birthday cake together. We put as many candles in a row around the cake as my mother is years old, but not all the candles are white ones. We use as many red ones as I am years old. This year we used ten red ones. We found that between each two red ones we had to place two white ones. How old is mother? _____

Test III.	State Normal School, EMPORIA, KAN. Bureau of Educational Measurements and Standards.	Put Pupil's Score Here.

THE KANSAS SILENT READING TEST.

Devised by F. J. Kelly

FOR

Grades 9, 10, 11 and 12.

City..... *State*..... *Date*.....

Pupil's Name..... *Age*..... *Grade*.....

School..... *Teacher*.....

Directions for Giving the Tests.

After the pupils are told not to open the papers, one paper is put upon the desk of each pupil in the class. Have each pupil fill the blank spaces at the top of this page. Then make clear the following:

Instructions to be Read by Teacher and Pupils Together.

This little five-minute test is given to see how quickly and accurately pupils can read silently. To show what sort of test it is, let us read this:

> Below are given the names of four animals. Draw a line around the name of each animal that is useful on the farm:
>
> cow tiger rat wolf

This exercise tells us to draw a line around the word cow. No other answer is right. Even if a line is drawn *under* the word cow, the exercise is wrong, and counts nothing. The test consists of a lot of just such exercises, so it is wise to study each exercise carefully enough to be sure that you know exactly what you are asked to do. The number of exercises which you can finish thus in five minutes will make your score, so do them as fast as you can, being sure to do them right. Stop at once when time is called. Do not open the papers until told, so that all may begin at the same time.

The teacher should then be sure that each pupil has a good pencil or pen. Note the minute and second by the watch, and say, BEGIN.

Allow exactly five minutes.

Answer no questions of the pupils which arise from not understanding what to do with any given exercise.

When time is up say STOP and then collect the papers at once.

Value 2.1.	**No. 1.** Mary is older than Nellie, and Nellie is older than Kate. Which girl is older, Mary or Kate. _____
Value 3.3.	**No. 2.** My fingers were numb with cold from carrying my skates. My breath looked like steam before my face and froze into a thick frost on my muffler. My mother saw me coming and called, "Clean off your shoes and then come in and get warm." Which do you think I had on my shoes, mud or snow? _____
Value 3.5.	**No. 3.** I have five plums and Mary has four plums. Jane comes along and we see that she has n't any. We want to divide with Jane in such a way that we shall all three have the same number. I give Jane two plums. How many must Mary give her? _____
Value 3.7.	**No. 4.** In the following words, find one letter which is contained in only three of them, and then cross out the word which does not contain that letter. ail thief live anvil
Value 3.8.	**No. 5.** A, B, C, and D on the line below represent four places lying in a straight line. From A to B is 4 miles, from C to D is 7 miles, from A to D is 14 miles. How far is it from B to C? A———B——C———D
Value 4.3.	**No. 6.** Bone is composed of animal matter and mineral matter. The former gives it toughness and the latter rigidity. Yesterday I placed a bone from a chicken's leg in a bottle of acid, and found this morning that I could wrap the bone around my finger like gristle. Which kind of matter was removed from the bone? _____

Value 4.4.

No. 7.

The pitch of a tone depends on the number of vibrations made by the vibrating body in a second of time. The greater the number of vibrations per second, the higher the tone. Two bodies are made to vibrate, the former 256 times a second, and the latter 384 times a second. Which produces the lower tone, the former or the latter?

Value 4.8.

No. 8.

There are three horizontal lines; the first is three inches in length, the second two inches, the third one inch. We know that if the second and third lines are joined end to end the resulting line will be as long as the first line. Suppose that the first and second lines are joined end to end. How many times as long as the third line will the resulting line be?

Value 4.9.

No. 9.

It was a quiet, snowy day. The train was late. The ladies' waitingroom was dark, smoky and close, and the dozen women, old and young, who sat waiting impatiently, all looked cross, low-spirited or stupid.

In this scene, the women probably kept their wraps on, because they wished to be ready to take the train. Pretty soon the station agent came and put more coal in the stove, which was already red-hot in spots. Do you think this made the women happier?

Value 5.6.

No. 10.

Below are three lines. If the first line is the shortest, place a dot above it. If the last line is shorter than the first but longer than the middle line, put a cross above the longest. If each of the other lines is longer than the last line, put a cross above the shortest line.

Value 6.2.

No. 11.

Four hundred fifty years ago the people of western Europe were getting silks, perfumes, shawls, ivory, spices, and jewels from southeastern Asia, then called the Indies. But the Turks were conquering the countries across which the goods were carried, and it seemed likely that the trade would be stopped.

In the foregoing paragraph, what was the country called from which the people of western Europe were getting the goods named in the paragraph?

Value 7.0.

No. 12.

Mrs. White and I were talking. She said to me, "Nora, I learned the other day that I am five years older than your mother."

To this I answered, "Then, Mrs. White, you are just three times as old as I am."

Nora is twelve years old. How old is her mother?

Value 7.9.

No. 13.

"Magnanimity in politics is not seldom the truest wisdom; and a great empire and little minds go together." (Burke.)

Study Burke's quotation carefully. If he was in favor of territorial expansion as the goal of English politicians he was a standpatter. If he believed in the establishment of justice in human relations even at the sacrifice of territorial expansion, he was a progressive. Which was he, a standpatter or a progressive?

Value 8.3.

No. 14.

Without making a line on paper at all, follow these instructions in your imagination. From the right-hand end of a line AB, draw a line BC at right angles to AB and half as long as AB. From the extremity of BC draw a line CD through the middle of AB, three times as long as BC. Join A and D. Do the lines in the figure enclose any surface or surfaces? If so, how many?

Value 8.9.	**No. 15.** Suppose that I have a dry sponge which weighs a half pound, and a pan of water. The pan and the water weigh three and one-half pounds. I soak the sponge in the pan of water and wring it out into a pint measure until the measure is full. The pint of water weighs a pound. I now put the sponge into the pan of water and weigh the pan and its contents. What will the weight be?
Value 52.0.	**No. 16.** At sea level water boils at 212 degrees above zero on the Fahrenheit thermometer, and at 100 degrees above zero on the Centigrade thermometer. The zero point on the Centigrade thermometer represents the same temperature as 32 degrees on the Fahrenheit thermometer. A change in temperature which would raise the mercury in a Centigrade thermometer 5 degrees would raise the mercury in a Fahrenheit thermometer how many degrees?

It will be noticed that the directions for giving the tests appear on each of the three sets. It is thought that the simplicity of these directions served to secure uniformity, even though the tests were given by the teachers and not by persons especially prepared for giving the tests. How the exercises were selected and how the values were derived are explained in Part II of this bulletin.

The method of scoring the papers is made clear on the reverse side of the class record sheet, a copy of which is here inserted.

KANSAS SILENT-READING TEST.

Directions for Scoring Papers.

1. Every answer given is counted either wholly right or wholly wrong.
2. Where the child's answer is incorrect, cross out the value indicated for that exercise in the margin.
3. Add the values of the exercises which are correctly answered. This sum is the child's score.
4. Place the score in the upper right-hand corner of the front page, in the square made for that purpose.
5. As a safeguard against teacher's misreading the exercises, the following answers are given:

Correct Answers to Some of the More Difficult Exercises.

Test for Grades 3, 4, 5:

No. 11. Ans.—8.
No. 14. Ans.—north.
No. 15. Ans.—16.
No. 16. Ans.—line under feather and teacher.

Test for Grades 6, 7, 8:

No. 5. Ans.—line under if.
No. 10. Ans.—cross in the large square.
No. 11. Ans.—line under ploughman.
No. 12. Ans.—line under success.
No. 13. Ans.—2 hours.
No. 15. Ans.—line under composa.
No. 16. Ans.—30 years.

Test for Grades 9, 10, 11, 12:

No. 2. Ans.—snow.
No. 3. Ans.—1.
No. 4. Ans.—line through thief.
No. 5. Ans.—3 miles.
No. 6. Ans.—mineral matter.
No. 7. Ans.—the former.
No. 8. Ans.—5 times.
No. 9. Ans.—no.
No. 10. Ans.—cross above the shortest line.
No. 12. Ans.—31 years.
No. 13. Ans.—a progressive.
No. 14. Ans.—2 surfaces.
No. 15. Ans.—3 pounds.
No. 16. Ans.—9 degrees.

By following these directions teachers vary but little, if any, in their ratings of papers which have the same value. Where any possible difference of opinion might arise among teachers with reference to the correct marking of any exercise, the correct answers are listed. This, it is believed, avoids errors in the ratings of pupils and makes the results comparable from school to school.

The method of distributing the scores for the pupils in any class and for finding the median score of the class are given on the face of the class record sheet reproduced herewith:

(This record sheet is to be returned to the Bureau of Educational Measurements and Standards, Kansas State Normal School, Emporia, Kan. A duplicate may be retained by the teacher. If needed, additional copies of this record sheet will be sent free.)

Kansas Silent Reading Test—Class Record Sheet.

City..... *School*..... *Grade*.....

Teacher..... *Date*.....

DISTRIBUTION OF PUPILS' SCORES.

Number of pupils whose scores fall	Number Pupils.
between 0 and .9	
between 1 and 1.9	
between 2 and 2.9	
between 3 and 3.9	
between 4 and 4.9	
between 5 and 6.9	
between 7 and 8.9	
between 9 and 10.9	
between 11 and 12.9	
between 13 and 14.9	
between 15 and 17.9	
between 18 and 20.9	
between 21 and 23.9	
between 24 and 26.9	
between 27 and 29.9	
between 30 and 34.9	
between 35 and 39.9	
between 40 and 44.9	
between 45 and 49.9	
between 50 and 59.9	
between 60 and 69.9	
between 70 and 79.9	
80 and above	
Total number of children	
Median score	

Instructions for Making the Distribution of Pupils' Scores, and for Finding the Median Score.

1. The teacher must be careful that her papers are grouped correctly by classes. If she has but one grade of pupils, say 5th grade, or but two divisions of one grade, say 5th A and 5th B, then her papers are all grouped together and but one "distribution" made. If, however, she has parts of two or more grades, say part 5th and part 6th, she must make two or more piles of papers, one for each grade.
2. Arrange the children's papers for any class group in order of scores, the lowest score on top.
3. To make the distribution called for, count the number of papers whose scores fall within the successive groups listed. For instance, if the lowest score is 3.5, the next lowest 5.7, the next 7.1, 7.8, 8.3, and so on, you will put "1" in group marked "between 3 and 3.9," "1" in the group marked "between 5 and 6.9," "3" in the group marked "between 7 and 8.9," and so on until the whole number of scores are recorded. The sum of these numbers must equal the number of children taking the test.
4. The median score is the score on the middle paper in the pile of papers arranged according to size of scores. If there are 35 papers, the median score is the score on the 18th paper. If there are 36 papers, the median score is half way between the score on the 18th paper and the score on the 19th paper.

These directions were readily followed by the teachers giving the tests and the distributions for all the classes were sent to the writer at the State Normal School at Emporia. From these distributions the total distribution for all the children in a given class was made and these total distributions are recorded in the following table:

TABLE I.—Distributions by grades of scores secured in the Kansas Silent Reading Test by children in 19 cities. Distributions are given by numbers. The median scores are given at the bottom of the table.

Scores Between	3d.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.
0- 0.9	77	29	4	13	3	1	2	3	.....	.....
1- 1.9	89	30	10	9	1	2	.....	.....	.....	.....
2- 2.9	125	40	20	17	7	4	.....	1	.....	.....
3- 3.9	81	33	17	20	11	8	3	4	.....	.....
4- 4.9	102	80	32	35	14	4	2	.....	1	.....
5- 6.9	261	228	111	89	41	30	7	6	3	.....
7- 8.9	158	213	165	140	66	33	15	9	5	.....
9-10.9	94	194	163	153	93	60	25	8	9	1
11-12.9	64	172	172	132	105	84	32	14	14	1
13-14.9	61	170	204	107	141	65	35	15	14	[illegible]3
15-17.9	46	128	226	163	238	125	68	54	34	8
18-20.9	28	94	207	146	199	146	83	41	19	6
21-23.9	8	40	112	86	147	91	63	46	28	6
24-26.9	5	9	34	61	114	93	87	72	54	15
27-29.9	3	7	27	28	52	40	44	39	35	10
30-34.9	4	4	12	34	78	73	69	77	50	29
35-39.9	1	2	14	5	19	25	28	46	24	6
40-44.9	.....	.....	5	2	4	18	23	30	20	10
45-49.9	.....	.....	.....	7	3	7	19	12	8	3
50-59.9	.....	.....	.....	17	2	3	12	5	5	2
60-69.9	.....	.....	.....	.....	.....	.....	3	.....	2	.....
70-79.9	.....	.....	.....	.....	.....	.....	1	2	.....	.....
80—above	.....	.....	.....	.....	.....	.....	.....	3	.....	.....
Total number children,	1,207	1,473	1,585	1,264	1,338	912	621	487	324	91
Median	6.0	9.9	13.7	13.4	16.5	18.8	22.9	25.8	26.0	28.8

TABLE II.—The figures in Table I are here reduced to per cents. Grades in school.

SCORES BETWEEN.	3d.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.
0- 0.9	6.4	1.9	0.2	1.0	0.2	0.1	0.4	0.6	.....	.....
1- 1.9	7.4	2.0	0.6	0.7	0.1	0.2	.....	.....	.....	.....
2- 2.9	10.4	2.7	1.3	1.3	0.5	0.4	.....	0.2	.....	.....
3- 3.9	6.7	2.2	1.1	1.6	0.8	0.5	0.8	.....	.....	.....
4- 4.9	8.5	5.4	2.1	2.8	1.0	0.4	0.4	.....	0.3	.....
5- 6.9	21.7	15.5	7.2	7.1	3.1	3.3	1.2	1.2	0.9	.....
7- 8.9	13.2	14.5	10.8	11.1	4.9	3.6	2.4	1.8	1.5	.....
9-10.9	7.8	13.2	10.6	12.1	7.0	6.6	4.1	1.6	2.8	1.1
11-12.9	5.3	11.7	11.2	10.5	7.9	9.2	5.2	2.9	4.3	1.1
13-14.9	5.1	11.5	13.3	8.5	10.6	7.1	5.7	3.1	4.3	3.3
15-17.9	3.8	8.7	14.8	12.9	17.9	13.7	11.0	11.2	10.6	8.8
18-20.9	2.3	6.4	13.5	11.6	14.9	16.0	13.4	8.5	5.9	6.6
21-23.9	0.7	2.7	7.3	6.8	11.0	10.0	10.2	9.5	8.7	6.6
24-26.9	0.4	0.6	2.2	4.8	8.6	10.2	14.1	14.9	16.8	16.6
27-29.9	0.3	0.5	1.7	2.2	3.9	4.4	7.1	8.1	10.9	11.0
30-34.9	0.3	0.3	0.8	2.7	5.9	8.0	11.2	16.0	15.6	22.2
35-39.9	0.1	0.2	0.9	0.4	1.4	2.8	4.5	9.5	7.4	6.6
40-44.9	.....	.....	0.3	0.1	0.3	2.0	3.7	6.2	6.2	11.1
45-49.9	.....	.....	.....	0.5	0.2	0.8	3.1	2.4	2.4	3.3
50-59.9	.....	.....	.....	1.3	0.1	0.3	2.0	1.0	1.5	2.2
60-69.9	.....	.....	.....	.....	.....	.....	0.5	.....	0.6	.....
70-79.9	.....	.....	.....	.....	.....	.....	0.2	0.4	.....	.....
80—above	.....	.....	.....	.....	.....	.....	.....	0.6	.....	.....
Total number children,	1,207	1,478	1,585	1,264	1,338	912	621	487	324	91
Median	6.0	9.9	13.7	13.4	16.5	18.8	22.9	25.8	26.0	28.8

VARIATIONS IN SCORES.

From these tables it is clear that the distribution of reading ability among the children of any given class is very wide. For instance, in a third grade, while 6.4 per cent of the children can not do a single exercise in five minutes, 8.1 per cent can do exercises the sum of whose values is fifteen or more. That means more than nine exercises of the test. While the median score is 6 in the third grade, one child in six can do twice as many, or can secure a score of at least 12.

Another striking fact is apparent from these tables. There are some children in nearly all the grades who can not do any of the exercises called for in five minutes, while the median scores increase from grade to grade by approximately three

points. Certain children are being promoted from grade to grade, even though they can not gain perceptibly in reading ability. Allowing for the few cases where normal intelligence is absent, the wide variation among the pupils who are supposed to be able to do the same work in school indicates a serious problem confronting the teacher. Assignments which one-fourth of the children require five minutes or more to complete, where the principal task is interpreting the printed page, may be done by another fourth of the class in two minutes or less in the case of practically all grades of children. Almost the same variation occurs when the members of the group taught by a single teacher are considered instead of a combined grade group from all the schools.

One other fact stands out also in these tables. The reading ability possessed by the median child in any one grade is superior to the ability possessed by at least a third of the children in the class above him and is no better than the reading ability possessed by at least a third in the class below him. The differentiation, therefore, in reading ability from year to year is insignificant in comparison with the wide difference in ability among the children in any given year or grade. The overlapping of ability from grade to grade can be seen by following across the table from left to right and noting that most of the scores are represented in practically all grades.

THE RELATIVE DIFFICULTIES OF THE THREE TESTS.

From the list of the medians at the bottom of the table it will be observed that there is an abrupt break in the scores between fifth and sixth grades and a less abrupt but nevertheless certain break between the eighth and ninth grades. These breaks are due to the fact that one test was given to grades 3, 4 and 5, and another test to grades 6, 7 and 8, and a third test to grades 9, 10, 11 and 12. Our work with the scores has shown us that although it was hoped that the values attached to the exercises in the three tests would make the scores secured comparable throughout all the grades, this is not exactly the case. In a group of 399 fifth-grade children who took both the tests designed for grades 3, 4 and 5 and for grades 6, 7 and 8, the median score of 13.46 was made on the test for grades 3, 4 and 5, while a median score of 11.66 was made by the same children in the test for grades 6, 7 and

8. It appears, therefore, that a difference in difficulty of approximately two points on a median score of 11 to 13 points occurs between these two tests. Similarly, 243 children in the eighth grade made a median score of 19.7 points on the test for grades 6, 7 and 8, but made a median score of 25.1 on the test for 9, 10, 11 and 12. These differences indicate imperfections in the values attached to the exercises. They do not, however, invalidate the comparisons made between different members in the same class tested by the same exercises. It does make it impossible to estimate the improvement between fifth and sixth grades or between eighth and ninth grades by the scores obtained by these grades in the tests.

THE NINETEEN CITIES COMPARED.

As an interesting study of the relative scores made by children in the various cities Table 3 is given. This represents the median scores of all the children of a given grade from each city. Of course, in some cases only small numbers of

TABLE III.—Median scores obtained by all the children taking the Kansas Silent Reading Test in the several grades of each of 19 cities.

	3d.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	11th.	12th.
Total of 19 cities.....	6.0	9.9	13.7	13.4	16.5	18.8	22.9	25.8	26.0	28.8
City A.....	7.6	13.3	13.8	19.7	19.1	18.7	21.8	25.6	26.4	.....
City B.....	8.3	7.25	14,6	13.8	18.0	.....	20.8	33.6	42.2	34.4 .....
City C.....	4.8	5.2	6.9	10.4	13.65	16.7	17.9	21.8	21.6	25.8
City D.....	3.0	7.9	11.7	13.0	15.8	18.0	21.6	21.7	27.2	.....
City E.....	4.7	8.2	15.0	12.8	15.1	15.0	22.9	20.25	20.7	29.0
City F.....	6.8	8.5	16.1	12.8	21.0	18.7	.....	.....	.....	.....
City G.....	3.9	5.2	6.8	8.1	12.2	8.55	.....	.....	.....	.....
City H.....	5.8	11.2	10.3	14.0	19.6	15.65	.....	.....	.....	.....
City I.....	5.2	10.3	17.55	19.1	18.3	22.4	21.6	25.6	26.7	.....
City J.....	5.4	6.8	10.3	9.7	13.0	14.6	20.7	21.2	.....	.....
City K.....	5.1	8.0	11.7	12.0	14.3	15.6	.....	.....	.....	.....
City L.....	6.6	14.4	13.9	16.8	20.7	21.1	.....	.....	.....	.....
City M.....	2.9	9.6	14.3	9.8	15.0	16.9	25.1	20.1	30.9	34.8
City N.....	6.8	13.7	17.3	15.3	16.8	23.05	25.1	25.15	25.5	31.5
City O.....	6.3	11.2	14.7	16.4	18.05	13.2	.....	.....	.....	.....
City P.....	7.9	10.0	13.8	14.3	17.6	28.0	20.7	24.4	26.0	28.9
City Q.....	5.7	11.5	14.3	13.6	18.0	20.4	28.5	28.9	25.7	.....
City R.....	4.6	9.1	13.1	13.8	16.8	19.4	.....	.....	.....	.....
City S.....	5.4	9.3	12.5	8.8	14.1	22 5	.....	.....	.....	.....

children were tested, while in other cities relatively much larger numbers were used, but even taking that into account, it is perfectly clear that the achievement in silent reading in some schools far surpasses the achievement in other schools. For example, the median scores obtained by children in the several grades of city G are little more than half the median scores secured by children in the several grades in city A. Other correspondingly wide differences might be pointed out, but a glance at the table will suffice to indicate that results as measured by these tests must depend to a considerable extent upon the practices which dominate the reading work in the various cities. Such a table as this one extended over a large number of cities and including a large number of children in each city would form the basis of an interesting study of the efficiency of the various methods employed in teaching reading. Abundant data for this study will undoubtedly be secured during the present school year from cities in Kansas and neighboring states.

Part II.

Derivation of the Test.

INSTRUCTIONS TO THOSE COÖPERATING IN THE WORK OF DERIVING THE TEST.

In response to a letter sent out by the writer from the Kansas State Normal School in October, 1914, setting forth the need of standardizing the work in reading in Kansas, forty-three superintendents signified their willingness to coöperate in deriving a test in reading. At about the same time the Visual Vocabulary, Scale A, by Prof. E. L. Thorndike, appeared in the *Teachers' College Record,* and it was thought best to confine our effort to deriving a test of ability of children to get meaning from the printed page. Of course, we realize that this ability involves vocabulary, but it involves to an even greater extent the ability to interpret the meaning of sentences and paragraphs. This ability to interpret is a complex thing, but is nevertheless an ability which children are called upon to use in their everyday reading of geography, history, arithmetic and the rest of the work of the school. It is the ability, also, which is used throughout life in all forms of reading. While it was realized that it would be advantageous to test separately the several elements which compose this complex ability to interpret the printed page, it seemed worth while to prepare a measure with which to determine how children compare in this complex ability, leaving for further study the determination of what constitutes the causes of the differences found.

GETTING SUITABLE EXERCISES.

Accordingly each member of the group coöperating in the work was asked to submit a number of exercises such as the following:

1. There are four words given below. Draw a line under the one which has the fewest letters in it:

   wasp cow flower grass

2. The color green is a mixture of blue and yellow. If I have yellow, what color must I mix with it to make green? ———

3. James and John had no money. Their father gave to James twenty-five cents and to John ten cents. James then gave John a dime. Which boy at last had more money than the other? ———

4. Below are two squares and a circle. If the circle is the largest, put a cross in it. If only one square is smaller than the circle, put a cross in the large square. If both squares are smaller than the circle, put a cross in the small square.

5. I met Frank and Tom on the street. Tom said to me, "Frank is three inches taller than I am, and he is sixty-two inches tall." Tom is two inches shorter than I am. How tall am I? ———

The instructions to be followed by those submitting exercises are here reproduced:

Prepare fifteen brief exercises according to the following specifications:

(*a*) Place each upon a separate slip of paper about 6 inches by 8 inches.

(*b*) Vary the exercises in difficulty from one simple enough to be appropriate for the second-grade child up to one difficult enough to be apropriate for the twelfth-grade child.

(*c*) For each exercise use not less than 15 words nor more than 60 words.

(*d*) Each exercise must satisfy the following requirements:

(1) It must be subject to only one interpretation.

(2) It must call for but one thing, so that what the child does in response to it will be wholly right or wholly wrong, and not partly right and partly wrong.

(3) The ability to be tested by each exercise must be the ability to get thought from the printed page. It must not depend upon obscure words nor any particular fund of information. In other words, the difficulty of each exercise must depend upon the child's interpreting the English language. To be sure, this must include the element of word knowledge, but let the word knowledge be secondary. A separate test for vocabulary will be given to supplement these exercises.

Directions no more specific were given, in the hope that the exercises submitted would include the greatest possible variety. Out of the several hundred exercises submitted, 192 were chosen as meeting reasonably well the requirements stated above and were assigned numbers from 1 to 192. Many of these were revised and modified so as to conform more accurately to the specifications.

THE TIME REQUIRED FOR CHILDREN TO DO THE SEVERAL EXERCISES.

The next step was to determine the average length of time required for sixty children in appropriate grades to do what was called for in each of the exercises. To do this, the exercises, typewritten uniformly, were mimeographed upon slips of paper uniform in size, one exercise on each slip of paper. The sixty copies of each exercise were then made into twelve bundles of five copies to the bundle. Then the grade in which the given bundle was to be used was indicated upon each bundle. For example, an exercise thought appropriate for grades 4, 5 and 6 would have "4th" written upon four of its bundles, "5th" written upon four of its bundles, and "6th" written upon the other four of its bundles. Thus, when all the returns were in this exercise would be found to have been given to twenty fourth-grade children, twenty fifth-grade children and twenty sixth-grade children. The device of using the children in groups of five rather than as individuals was adopted because of the difficulty of taking time upon each child separately. In deciding to which grades of children the several exercises should be given, the opinions of the members of the Training School faculty and other interested members of the Normal School faculty were used. After the 192 exercises were thus mimeographed and stapled into bundles of five, these bundles were arranged into forty-three piles for the forty-three persons coöperating in deriving the test. In making up these piles the sixty copies of each exercise were distributed to four different cities, the three bundles sent to each city being for three different grades. Thus the three bundles of exercise No. 1, let us say, were given to children in grades 2, 3 and 4 in city 1; other three bundles of the same exercise were given to grades 2, 3 and 4 in city 2; other three bundles to grades 2, 3 and 4 in city 3; and the remaining three bundles of the same exercise to grades 2, 3 and 4 in city 4. In this way exercise No. 1 was given to five second-grade children in city 1, to five second-grade children in city 2, to five second-grade children in city 3, and to five second-grade children in city 4; also to five third-grade children in each of the four cities; also to five fourth-grade children in each of the four cities.

One of the assortments of exercises was sent to each co-operating person, with the following instructions for determining the time required for each exercise, and with record sheets in the form reproduced herewith upon which to send in the data secured:

Directions for Determining the Time Required for Each Exercise in the Kansas Reading Test.

1. Sort out all the stapled bundles of exercises which are to be given to each of several grades.

2. List these exercises, by numbers, on the record sheet, in the left-hand column, in the order in which you expect to give them, preferably the highest grade first.

3. Fill out column 2 on the record sheet. Column 2 should contain the grade of the children to whom you are to give the exercise. This is indicated in pencil on each bundle.

4. Take the bundles which you expect to give in any one grade—say an eighth grade—and the record sheet, and go to the most nearly typical eighth grade in your school. (Let us understand that an eighth grade is one which is starting this semester on the last half of the eighth-grade work. Similarly consider each grade.)

5. Arrange the children in the grade in such a way that at least five sit one behind the other. To such a row of five children one exercise will be given, then the next row of five children will take the next exercise, and so on until all the exercises have been used, or until all the children have had one exercise. Then return to the first row of children and go over the grade again, row after row, as many times as the number of exercises requires.

6. See that each child has a well-sharpened pencil.

7. When you have the children thus arranged, see that they all understand what is expected of them when their turns come. Directions about as follows should be ample: "We want to see how quickly you can read and understand the exercises written upon these little slips of paper. On each slip either a question is asked which requires only a word to answer, or else you are told to do something which requires only a line, a circle, a cross, or something of that sort. Read carefully the exercise until you are sure you understand just what it means, then answer the question or make the mark asked for. Then tear off the top leaf quickly and pass the rest back to the child behind you. That child will do the exercise as quickly as he can and tear off the top leaf and pass the rest back. When the fifth child finishes he will hold up his hand. The main thing is to be sure you do the exercises correctly, but we want to see how quickly you can do them also."

8. When the children understand thoroughly, take the bundle of five copies of the exercise which you have listed first on the record sheet, and when the second hand of your watch is at a convenient starting place, lay the bundle of slips down on the desk of the first child in the row and say, "Do just what the exercise says, then tear off the top slip and pass the others back."

9. Record in the fourth column of the record sheet the total time, *in seconds*, from when the first child began until the fifth child finished. Have those slips passed to the front again and removed from the desk.

10. Carry out the same plan with the next exercise and the second row of children, and so on till you have completed the list of exercises to be given to that grade of children.

11. The third column of the record sheet should now be filled out for each exercise given to the grade. It will in practically all cases be 5, but to safeguard us against any irregularities in counting out the slips, or in giving the exercises, please state how many children took part in each exercise.

12. Look over the answers and record in the column 4 the number of those who wrongly answer each exercise. If you have comments about the exercises indicating their weakness as reading-test material, please make them in column 5. When the record sheet is complete for all the exercises which you received, please return it to me.

Revision of Directions.

After writing the sheet of directions found inclosed herewith I have experimented further in giving the exercises to rows of children, and feel sure that the following suggestions may be safely followed: After you have tried out one row of children with a given exercise, so as to acquaint yourself with the nature of the task, then you may have all the rows of children in the room start their exercises together. It complicates your task a little but greatly shortens the time required. Lay a bundle of five exercises, face down, on the desk of the first child in each row. Be sure that you note the beginning time, both minutes and seconds, when you say "Begin," and the finishing time for each row. Then before going on to any other exercises put down on the record sheet the time used for each exercise and the number of incorrect responses made to each exercise. Very truly yours, F. J. KELLY, Emporia, Kan.

FORM USED FOR REPORTING DATA.

THE KANSAS READING TEST.

Record Sheet.

City..... School..... Date.....

The number on each exercise.	Grade of pupils doing each exercise.	Number of children doing each exercise.	Total time required, in seconds.	Number wrongly answered.	Any comments about the exercises.

Not all of the coöperating persons found time to do this rather laborious task, but thirty-four of them did, and sent in the record sheets with the data called for.

After all these reports were received the data for each exercise were assembled upon a card of the following form. The abbreviations on the card mean: *Sc*, school or city; *Ch*, number of children; *Sec*, seconds required; *Er*, errors made in answering. The card here reproduced contains the data for exercise No. 148, given to grades 4, 5 and 6, in cities No. 40, No. 35, No. 22 and No. 26.

Sample of form used for assembling data for a given exercise.

No. 148.

Gr. 4.				Gr. 5.				Gr. 6.				Gr. —			
Sc.	Ch.	Sec.	Er.	Sc.	Ch.	Sec.	Er.	Sc.	Ch.	Sec.	Er.	Sc.	Ch.	Sec.	Er.
40	5	195	1	40	5	195	0	40	5	95	0				
35	5	190	1	35	5	130	1	35	5	185	2				
22	5	175	3	22	5	180	1	22	5	150	0				
26	5	120	2	26	5	185	3	26	5	235	3				

For the selection of the forty-eight exercises which were to compose the tests these cards were studied carefully. Any exercises upon which children from grade to grade differed very widely, or where the percentage of errors was very high, were thrown out. So also was any exercise which was adversely criticized by any of the teachers or superintendents handling it. In this way the forty-eight best exercises were selected, ranging from very easy ones to very difficult ones.

HOW THE VALUES ATTACHED TO EXERCISES WERE DETERMINED.

This done, the task remained of evaluating all the exercises upon a common basis. To do this two distinct problems arose: (1) What relative weights should attach to the two factors, of time required for doing the exercise, and per cent of errors made in doing the exercise? (2) How does the difficulty of an exercise which requires, say, twenty seconds on the average for seventh-grade children compare with the difficulty of an exercise which requires twenty seconds on the average for third-grade children? In meeting these two prob-

lems no thoroughly satisfactory method has ever been devised, so far as I know. I shall try to make clear how these two problems were treated in the present test, fully realizing that these methods in both cases are lacking somewhat in scientific precision.

COMBINING THE FACTORS OF TIME AND ERROR.

To illustrate how the factors of time and error were combined in calculating the value to be attached to the correct doing of each exercise, I will use the data from two exercises which were given to grades 5, 6 and 7. These exercises were:

1. A child wrote these letters on the blackboard, b y a k. He then rubbed out one letter and put c in its place. He then had b y c k on the blackboard. What was the letter which he erased? ————

2. A recipe calls for milk, sugar, cornstarch and eggs. I have milk, sugar and eggs. What must I get before I can use the recipe? ————

The first exercise required a total of 3072 seconds for the sixty children to do it, and four of the children did it wrongly, while the second exercise required 2659 seconds for the sixty children, but seventeen children did it wrongly. The question then was, Which of these two exercises should have the greater value?

This would depend necessarily upon how we expect to score the papers in the end in case of errors. If we were to give some value in scoring the completed tests to exercises which the children did, but did incorrectly, then of course the factor of error should weigh less in assigning a value to the exercises than it should if exercises done wrongly in the final test were to have no value in the final score. It was necessary, then, to decide upon the method to be used in scoring the completed test before answering the question of relative weights to be attached to time and errors. Because of the difficulty in rating by different teachers of papers with a scale of values attached to errors of varying degrees of seriousness, it seemed best to give no value to the exercises in the final test unless done without error. Since the chief value of the test was in making its results comparable from school to school, it was more necessary that they be subject to no difference in rating from teacher to teacher than that absolute accuracy be had in the measure of any particular child's ability. Since it seemed unwise to count anything for exercises done wrongly in the final

test, then the value that should be attached to the doing of each exercise should give the maximum of weight to the factor of error.

Therefore, it was decided that the value to be attached to each exercise should be determined by the length of time required to do the exercise *without error*. In the exercises used as illustrations the first exercise required 3072 seconds for fifty-six children to do it without error, or an average of 54.9 seconds per child. In the second exercise 2659 seconds were required for forty-three children to do the exercise correctly, or an average of 61.9 seconds per child. The relative difficulties of the two exercises then stand as 54.9 to 61.9, even though the latter exercise was finished in the shorter time. If the child should be given a score of 1.8 for doing the first exercise, he should be given a score of 2.1 for doing the second exercise in a test where he was given a certain length of time to do as many exercises as he could, but was given nothing for the exercises which he did wrongly.

RELATIONS AMONG DATA SECURED FROM DIFFERENT GRADES.

The solving of the second problem was more complicated. If each exercise had been timed in all grades, that would, of course, have solved the problem. It seemed unwise, however, to expect lower-grade pupils to try exercises which were most appropriate for high school, the same as it seemed inappropriate for high-school pupils to take exercises which were most appropriate for lower grades.

To restate the question, we may ask, How does an exercise requiring twenty seconds on the average for fourth-grade children compare in difficulty with an exercise which requires twenty seconds on the average for fifth-grade children? Undoubtedly the second exercise is the more difficult, but how much more difficult is the question.

It was decided to use the following device as a solution for the problem: Of the total 192, twenty-nine exercises were given to grades 4 and 5 alike. Twenty children in each grade took each exercise. Therefore there were 580 fourth-grade attempts and 580 fifth-grade attempts to do the same exercises. The time required on the average for each child in the fourth grade was 128.4 seconds per exercise, while in the fifth grade the time required on the average was 92.4 seconds. On this

basis we calculated that the relative abilities of the two grades in reading should stand inversely as the ratio 128.4 to 92.4. Thus the values to attach to two exercises, one of which required twenty seconds on the average in the fourth grade, the other of which required twenty seconds on the average in the fifth grade, would be in the ratio 92.4 to 128.4. By taking in the same way the time required by fifth grades and fourth grades on the exercises which they did in common, it was discovered that the fifth-grade children required 90 seconds per exercise, while the sixth-grade children required 78.4 seconds per exercise. Each of these figures takes into account the factor of error as explained above.

Securing a like figure for the difficulty experienced by children in each grade in terms of the difficulty which children in the next higher grade experienced in the same exercises, and then reducing all to a common base of 100 for the difficulty experienced in the third grade, we have the following series of figures representing difficulties experienced in the several grades: third, 100; fourth, 61.6; fifth, 44.3; sixth, 38.2; seventh, 29.78; eighth, 21.59; ninth, 25.49; tenth, 19.79; eleventh, 20.37; and twelfth, 20.43.

Irregularity of the decline in these figures is an indication, probably, that insufficient data were used to secure a thoroughly reliable measure of the relative strengths among the various classes. It is hoped that additional data may be used later to correct this obvious fault. It is believed, however, that the measure secured by tests based upon these figures will be much nearer the truth than superintendents can get without it, and that we are justified in putting it out as a tentative measure until such time as a more accurate test can be devised.

REDUCING ALL VALUES TO A COMMON BASE.

To translate the value of each exercise into terms of the values given above for each grade, it was necessary to combine these figures into groups corresponding to the grades to which each exercise was given. For example, an exercise was given to grades 2, 3 and 4, or to grades 3, 4 and 5, or to grades 4, 5 and 6, etc. To each exercise was assigned a value, as indicated above, according to the length of time it required for the sixty children in the three grades (or two grades in the case of the third and fourth grades, and four grades in the case of the ninth, tenth, eleventh and twelfth grades) to do the exercise,

divided by the number of children who did the exercise correctly. Now this figure standing for the given exercise must be evaluated in terms of the grades of the children to which the exercise was given. For example, the average of the figures 100 and 61.6, standing for grades 3 and 4, respectively, is 80.8. Since certain exercises have been given to grades 2, 3 and 4, and it was found that the results from grade 2 had to be disregarded because of the large number of errors, certain exercises were to be evaluated on the basis of 80.8. In the same way, the average of the numbers standing for grades 3, 4 and 5 is 68.9; the average for grades 4, 5 and 6 is 48.3; for 5, 6 and 7 is 37.42; for 6, 7 and 8 is 29.85; for 7, 8 and 9 is 25.62; for 8, 9 and 10 is 22.29; and for 9, 10, 11 and 12 is 21.52. Therefore, in reducing the figures which stand for the value of each exercise to a common basis for all exercises this list of figures was used. For example, the simplest exercises which it seemed wise to include in the test was the following:

The air near the ceiling of a room is warm, while that on the floor is cold. Two boys are in the room, James on the floor and Harry on a box eight feet high. Which boy has the warmer place? ————.

This exercise was given to grades 3, 4 and 5, and required an average of 56.9 seconds to be done correctly. Using this exercise as a unit of difficulty we arbitrarily assigned it a value of 1. The value of every other exercise was determined in terms of the value of this exercise. For example, the following exercise was also given to grades 3, 4 and 5:

In going to school James has to pass John's house, but does not pass Frank's. If Harry goes to school with James, whose house will Harry pass, John's or Frank's? ————.

This required an average of 129.4 seconds, and was therefore assigned a value of 2.3 in the final test, because it required 2.3 times as long as had the exercise arbitrarily valued at 1.

Consider again this exercise:

Three words are given below. One of them has been left out of this sentence: I can not ———— the girl who has the flag. Draw a line around the word which is needed in the above sentence.

red see come.

This exercise was given to grades 4, 5 and 6 and required an average of 56.7 seconds per pupil. This time is almost exactly the same as was required for the exercise which was arbitrarily assigned a value of 1, but the first exercise was given to grades

3, 4 and 5, while this exercise was given to grades 4, 5 and 6. Therefore, even though the average time is almost exactly the same, there is a difference between the difficulties represented by the two exercises. To reduce the last exercise to the basis of the first one, then, it is necessary to multiply the value 56.7 by 68.9, the average of numbers representing grades 3, 4 and 5, and divide the result by 48.3, the average of the numbers representing grades 4, 5 and 6, thus giving us the value 1.4 to assign to the last exercise. Following this plan, the value was assigned to each of the forty-eight exercises which were selected for use in the final tests, and these are the values which appear on the margins of the test sheets as they are printed.

FINAL ARRANGEMENT OF THE CHOSEN EXERCISES.

After having assigned these values in this way, all that remained to be done was to assort them into three appropriate groups, giving the best variety possible to each group, so as to make it most appropriate for the respective grades to which the test would be given. Thus we have the sixteen exercises arranged for the test for grades 3, 4 and 5 and the appropriate values attached to each of them. In the same way we have the sixteen exercises for grades 6, 7 and 8 with the appropriate values attached to them, and the sixteen exercises for grades 9, 10, 11 and 12 and the appropriate values attached to them. All the values are determined upon exactly the same basis and the results from grade to grade should therefore be comparable, even though the same test is not given to all grades.*

* The results obtained in giving the tests indicate that this is not exactly the case, as pointed out in Part I. It seems likely that the data obtained for grades 9, 10, 11 and 12 for use in evaluating the exercises are not reliable. Probably too few high schools were used, and probably the students did not take the task seriously.

Other publications of the Bureau of Educational Measurements and Standards are:

No. 1.—The Report of the Survey of the Public Schools of Leavenworth, Kansas.

No. 2.—The Cost of Instruction in Kansas High Schools, by Walter S. Monroe.

VOL. IV. NEW SERIES. No. 8.

KANSAS STATE NORMAL SCHOOL

EMPORIA

A Report of the Use of the Courtis Standard Research Tests in Arithmetic in Twenty-four Cities

BY WALTER S. MONROE, PH. D.,

Professor of School Administration, and Director of the Bureau of Educational Measurements and Standards, Kansas State Normal School.

NUMBER 4.

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INTRODUCTORY STATEMENT.

AN important function of the Bureau of Educational Measurements and Standards is to tabulate data reported to it by superintendents and teachers and to publish them in a form so that they may be used as a basis for the interpretation of facts which may be collected by a superintendent. Closely related to this activity there is a supplementary function of suggesting forms of tabulation for scores derived from giving standard tests so as to reveal the conditions which exist. This "Report on the Use of the Courtis Standard Research Tests in Arithmetic in Twenty-four Cities" of the state represents the attempt of the Bureau of Educational Measurements and Standards to fulfill these two functions.

WALTER S. MONROE, *Director*,
BUREAU OF EDUCATIONAL MEASUREMENTS AND STANDARDS,
KANSAS STATE NORMAL SCHOOL, EMPORIA, KAN.

JANUARY 8, 1916.

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A Report of the Use of the Courtis Standard Research Tests in Arithmetic in Twenty-four Cities.*

WALTER S. MONROE,

Professor of School Administration, and Director of the Bureau of Educational Measurements and Standards, Kansas State Normal School.

CHAPTER I.

The Tests and the Tabulation of the Scores.

IN October, 1914, the Kansas State Normal School extended to a number of city superintendents in the state an invitation to join in a coöperative study of the teaching of arithmetic by using the Courtis Standard Research Tests, Series B, to measure certain products resulting from the teaching of arithmetic. This invitation met with a very gratifying response and a number of other superintendents volunteered. As a result these tests were given in the following cities at the beginning of the second half of the school year, which was the last week of January, 1915: Arkansas City, Bucklin, El Dorado, Fredonia, Ellinwood, Eskridge, Fort Scott, Garden City, Irving, Kansas City, Lincoln, Little River, Lyons, Marion, Minneapolis, Neodesha, Ottawa, Salina, Sterling, Syracuse, Sylvia, Topeka, Valley Falls, and Wellington.

Of these cities the following repeated the tests in May, 1915: Arkansas City, Ellinwood, Fredonia, Fort Scott, Marion, Neodesha, Ottawa, Salina, Syracuse, Topeka, and Valley Falls.

As a result of a more general invitation, the following cities joined in the giving of these tests in May: Blue Rapids, Cawker City, Florence, Gardner, Halstead, Iola, Hope, Junction City, La Harpe, Leavenworth, Lincoln, Mound City, Norton, Norwich, Oswego, Sedan, Seneca, and Stafford.

The superintendents were asked to send to the Bureau of Educational Measurements and Standards a duplicate record sheet for each pupil and for each class, together with information concerning the course of study and methods of teaching. This report is based upon tabulations made from the class record sheets from the following cities. The other cities which gave the tests did not sent copies of their class record sheets.

* The author of this bulletin desires to acknowledge the coöperation of the Kansas superintendents, teachers and boards of education which have made this report possible.

Mid-year.	*May.*
Arkansas City.	Arkansas City.
Bucklin.	Fort Scott.
Ellinwood.	Fredonia.
Emporia.	Iola.
Fort Scott.	Junction City.
Fredonia.	Leavenworth.
Garden City.	Lincoln.
Irving.	Neodesha.
Lincoln.	Marion.
Neodesha. *	Minneapolis.
Marion.	Norton.
Ottawa.	Ottawa.
Salina.	Salina.
Topeka.	Syracuse.
Normal Training School. †	Topeka.
Valley Falls.	Normal Training School.
Wellington.	Valley Falls.

THE TESTS.

The Standard Research Tests in Arithmetic, Series B,‡ consist of four tests, one in each of the four fundamental operations with integers. The first examples of each of the tests are reproduced here to show the nature of the examples.

ARITHMETIC.—TEST NO. 1. *Addition.*

[Series B, Form 1.]

927	297	136	486	384	176	277	837
379	925	340	765	477	783	445	882
756	473	988	524	881	697	682	959
837	983	386	140	266	200	594	603
924	315	353	812	679	366	481	118
110	661	904	466	241	851	778	781
854	794	547	355	796	535	849	756
965	177	192	834	850	323	157	222
344	124	439	567	733	229	953	525

ARITHMETIC.—TEST NO. 2. *Subtraction.*

[Series B, Form 1.]

107795491	75088824	91500053	87939983
77197029	57406394	19901563	72207316
160620971	51274387	117359208	47222970
80361837	25842708	36955523	17504943

* Tests were given in April instead of the last week in January.

† Tests were given in December instead of in January.

‡ A special Kansas edition of Form 1 of these tests was used.

ARITHMETIC.—TEST NO. 3. *Multiplication.*

[Series B, Form 1.]

8246	3597	5739	2648	9537
29	73	85	46	92
4268	7593	6428	8563	2947
37	640	58	207	63

ARITHMETIC.—TEST NO. 4. *Division.*

[Series B, Form 1.]

$25\overline{)6775}$	$94\overline{)85352}$	$37\overline{)9990}$	$86\overline{)80066}$
$73\overline{)58765}$	$49\overline{)31409}$	$68\overline{)43520}$	$52\overline{)44252}$

GIVING THE TESTS.

In giving the tests, a printed copy was furnished to each pupil. In addition to some general directions he was told, for the addition test: "You will be given eight minutes to find the answers to as many of these addition examples as possible. Write the answers on this paper directly underneath the examples. You are not expected to be able to do them all. You will be marked for both speed and accuracy, but it is more important to have your answers right than to try a great many examples."

The special directions for the other tests were similar, except that the time allowed was different. For the subtraction test, four minutes were allowed; for the multiplication test, six minutes; and for the division test, eight minutes.

MARKING THE TEST PAPERS.

In scoring the test papers uniform directions were followed by all who gave the tests, and only two facts were taken into account—the number of examples completed and the number of examples done correctly. No credit was given for examples partially done nor for answers partially correct. An answer to an example was either right or wrong. The "number of examples completed" is referred to as the "number of examples attempted," or, more simply, the "number attempted." The "number of examples done correctly" is referred to as the "number right." A pupil's score is written thus: 12 attempted and 10 right. If this score were for the addition test, it would mean that in eight minutes the pupil was able to do 12 addition examples, each example consisting of three columns and

nine figures to the column, and have 10 of the 12 examples correct. From the number of examples attempted and the number right, one can compute the per cent of examples done correctly. It is obtained by dividing the number right by the number attempted. In the above case the per cent of examples done correctly is 83. For convenience this per cent of examples done correctly is usually called the "accuracy" and the number of examples attempted the "speed."

TABULATING THE SCORES OF A CLASS.

In describing the scores made by the members of a class it is convenient to do it by telling how many pupils attempted as many as one example, how many attempted as many as two examples, etc. Such a statement of the number of examples attempted by the members of a class is called the "distribution of the scores according to the number of examples attempted," or, more simply, the "distribution according to speed." If the per cent of examples done correctly has been computed, a similar distribution of these scores can be made according to the per cent of examples done correctly, or accuracy.

In tabulating the scores a class record sheet of the form shown in figure I was used. The large figures at the top of the sheet refer to the number of examples attempted and the small figures within the squares refer to the number of examples done correctly. The sheet is arranged so that the per cent of examples done correctly is computed automatically and the distribution of the scores according to both speed and accuracy is obtained at the same time. In figure I the distribution according to speed is found at the bottom of the record sheet and is to be read thus: Three pupils attempted only 6 examples, two pupils attempted only 7 examples, five pupils attempted only 8 examples, etc. The distribution according to accuracy is found at the right-hand side of the sheet and is to be read thus: The per cent of examples done correctly by two pupils was less than 50 per cent, for five pupils it was between 50 per cent and 60 per cent, for five other pupils it was between 60 per cent and 70 per cent, etc. These two distributions, the one according to the per cent of examples done correctly and the other according to the number of the examples attempted, describe the ability of the pupils of this class to do the examples of the multiplication test.

FIGURE I. The class record sheet for tabulating the scores of individual pupils according to both speed and accuracy. The scores tabulated on this sheet were made by a 7-B class on the multiplication test.

SCORE IN NUMBER OF EXAMPLES ATTEMPTED.

SCORE.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total.
Per cent.	—	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
100							2		1					1	1	1										6
90			—	—	—	—	—	—	—	—	9	10	11	12	13	14	15	16	17	18	18–19	19–20	20–21	21–22	22–23	
90											2	2														4
80			—	—	—	4	5	6	7	8	8	9	10	11	12	12–13	13–14	14–15	15–16	16–17	16–17	17–18	18–19	19–20	20–21	
80									2	1	4	3	2													12
70			—	—	3	—	—	5	6	7	7	8	9	10	10–11	11	12	12–13	13–14	14–15	14–15	15–16	16–17	17–18	17–19	
70								1		1	1	1		1												5
60			—	2	—	3	4	—	5	6	6	7	8	8–9	8–9	9–10	10–11	11	11–12	12–13	12–13	13–14	14–15	14–16	15–16	
60									1				1	3												5
50			1	—	2	—	3	4	4	5	5	6	6–7	7	7	8	8–9	9–10	9–10	10–11	10–11	11–12	11–13	12–13	12–14	
50							1	1	1	1								1								5
0 to 49	0	0	0	0–1	0–1	0–2	0–2	0–3	0–3	0–4	0–4	0–5	0–5	0–6	0–6	0–7	0–7	0–8	0–8	0–9	0–9	0–10	0–10	0–11	0–11	
0 to 49										1	1															2
Total							3	2	5	4	8	6	3	5	1	1		1								39

Accuracy. Figures in small type indicate scores in number of examples right.

Median scores: speed, 10.8; accuracy, 83.

CLASS MEDIANS.

The ability of a class may be more briefly described by the median of each of these distributions. The median is a mid-measure. It is a score such that there are half of the scores above it and half below it. The median of the speed distribution in figure I is 10.8 examples. There are eight scores of ten examples attempted, and if we consider them uniformly distributed over this interval, two of the eight will be counted with the scores above the median and five with those below the median. This makes nineteen scores above the median and nineteen scores below the median. The remaining score is the median. (The detailed directions for computing medians are given in Folder D, which accompanies the Standard Research Tests in Arithmetic.)

TABULATING THE SCORES FOR A CITY.

The superintendents in the cities included in this report sent duplicate copies of their class record sheets to the Bureau of Educational Measurements and Standards. A distribution for a city was obtained by adding together the distributions of all classes of the same grade. Where A and B classes of the same grade were reported, they were combined. In most all cases the tests were given after mid-year promotions had been made. In the few cases where this was not true, the classification of the pupils was advanced half a grade, so that in those cities which repeated the tests in May the pupils would have the same classification at both times.

The fourth-grade mid-year distributions, according to the number of examples attempted in the addition test, are given in table I. Each city has been given a number. For city I the table is to be read: One pupil failed to complete a single example, two pupils attempted one example, sixteen pupils attempted two examples, thirty-three pupils attempted three examples, and so on. The total number of fourth-grade pupils taking the test in this city was 164. The median score for the city is 4.7 examples. The distributions for the other cities are read in the same way. At the bottom of the table the total distribution for all cities, the total number of fourth-grade pupils taking this test, and the median score for the state are given.

In order that the distribution for one city might be more easily compared with that of another, all of the distributions have been reduced to per cents. Table II was derived from table I in this way. For city I this table is read: .6 of one per cent of the fourth-grade pupils failed to complete one example, 1.2 per cent of the pupils completed only one example, 9.5 of the pupils completed only two examples, etc. Tables II to XXXI give the distributions and medians for the mid-year scores. Similar data for the May scores are given in tables XXXII to LXI. The figures in black-faced type indicate the interval in which the median is located. For purposes of comparison the distributions according to the number of examples attempted and the median for the state of Indiana have been reproduced in the tables giving the May scores. They are taken from "Arithmetic; A Coöperative Study in Educational Measurements," by M. E. Haggerty, Indiana University Bulletin, Vol. XII, No. 18, March, 1915.

TABLE I. Fourth grade. Mid-year. Speed. Addition. Number of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.
I	1	2	16	33	48	30	26	9	3	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	169
II	....	2	13	10	24	9	10	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	72
III	1	....	2	4	11	12	5	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	43
IV	1	5	14	33	50	38	27	11	5	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	185
V	8	15	34	47	35	28	5	6	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	180
VI	1	2	2	3	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13
VII	1	....	2	6	8	6	1	5	2	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32
VIII	6	13	46	67	115	79	74	47	19	4	....	....	....	....	1	1	1	....	....	....	....	....	....	....	....	473
IX	....	1	1	5	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	9
X	5	6	15	21	36	24	22	8	4	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	143
XI	....	2	3	9	12	19	11	7	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	64
XII	....	7	9	15	19	20	5	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	78
XIII	....	1	10	17	15	12	12	5	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	75
XIV	....	....	....	1	1	5	6	1	3	4	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	22
XV	....	....	1	1	6	1	5	1	3	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19
XVI	....	....	2	6	8	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19
XVII	....	....	....	1	6	14	22	13	18	6	6	7	2	1	1	....	....	....	....	....	....	....	....	....	....	97
XVIII	1	3	11	21	29	23	30	9	7	....	1	2	....	1	....	....	....	....	....	....	....	....	....	....	....	138
XXI	....	....	5	14	12	9	13	6	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	62
Totals	25	59	186	314	438	334	275	141	71	21	10	10	2	2	2	2	1	....	....	....	....	....	....	....	....	1,898

TABLE II. City distribution Fourth grade. Addition. Speed. Mid-year scores. January, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	.6	1.2	9.5	19.6	28.4	17.8	15.4	5.3	1.8	....	....	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	169	4.7
II	....	2.8	18.1	13.9	32.4	12.5	13.9	5.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	72	4.5
III	2.4	....	4.8	9.4	25.6	28.0	11.7	18.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	43	5.5
IV	.5	2.7	7.5	17.7	26.9	20.4	14.5	5.9	2.7	1.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	186	4.6
V	....	4.4	8.3	18.9	26.1	19.4	15.6	2.8	3.3	.6	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	180	4.7
VI	....	7.7	15.4	15.4	23.1	15.4	23.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13	4.6
VII	3.2	....	6.3	19.0	25.0	19.0	3.2	15.7	6.3	....	3.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32	4.9
VIII	1.3	2.8	9.7	14.2	24.3	16.7	15.7	9.9	4.0	.8	....	....	....	....	.2	.2	....	.2	....	....	....	....	....	....	....	473	4.9
IX	....	11.2	11.2	55.6	11.2	11.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	9	3.6
X	3.5	4.2	10.5	14.7	25.2	16.8	15.4	5.6	2.8	.7	....	....	....	....	....	.7	....	....	....	....	....	....	....	....	....	143	4.7
XI	....	3.2	4.7	14.1	18.8	29.7	17.2	11.0	1.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	64	5.3
XII	....	9.0	11.6	19.3	24.4	25.7	6.5	1.3	1.3	1.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	78	4.4
XIII	....	1.4	13.4	22.7	20.0	16.1	16.1	6.7	2.7	1.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	75	4.7
XIV	....	....	....	4.6	4.6	22.8	27.3	4.6	13.8	18.2	4.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	22	6.7
XV	....	....	5.3	5.3	31.6	5.3	26.4	5.3	15.8	....	5.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	6.2
XVI	....	....	10.6	31.6	42.2	5.3	10.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	4.3
XVII	....	....	....	1.1	6.2	14.5	22.7	13.5	18.6	6.2	6.2	7.3	2.1	1.1	1.1	....	....	....	....	....	....	....	....	....	....	97	7.5
XVIII	.7	2.2	8.0	15.2	21.0	16.7	21.8	6.5	5.1	....	.7	1.5	....	.7	....	....	....	....	....	....	....	....	....	....	....	138	5.2
XXI	....	....	8.1	22.6	19.4	14.6	21.0	9.7	3.3	1.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	62	5.0
Totals	1.3	3.1	9.8	16.6	23.2	17.7	14.6	7.5	3.8	1.1	.5	.5	.1	.1	.1	.05	....	....	....	....	....	....	....	....	....	1,894	4.8

TABLE III. City distributions. Fourth grade. Subtraction. Speed. Mid-year scores. January, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	2.4	10.1	18.5	21.4	19.7	10.7	9.5	5.4	1.8	....	....	.6	....	....	....	....	....	....	....	....	....	....	....	....	168	4.9
II	14.1	9.9	11.3	15.6	15.6	15.6	8.5	1.5	4.3	4.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	71	4.0
III	....	....	4.8	18.7	14.0	21.0	18.7	11.7	9.4	....	....	....	....	2.4	....	....	....	....	....	....	....	....	....	....	....	43	5.7
IV	1.1	4.3	6.5	12.4	18.3	17.7	18.3	11.8	3.8	3.2	1.1	.5	.5	.5	....	....	....	....	....	....	....	....	....	....	....	186	5.1
V	....	1.1	6.5	11.4	16.8	19.5	17.8	10.3	8.1	3.8	3.8	.5	....	....	....	.5	....	....	....	....	....	....	....	....	....	185	5.7
VI	....	....	23.1	15.4	23.1	30.8	7.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13	4.6
VII	....	3.2	9.4	19.0	15.7	15.7	19.0	9.4	3.2	6.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32	5.2
VIII	2.3	2.8	7.0	10.4	14.6	20.1	18.2	13.5	7.2	19.0	.8	.2	.8	.2	....	....	.2	....	....	....	....	....	....	....	....	474	5.6
IX	....	11.2	22.3	55.6	11.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	9	3.4
X	1.4	4.3	9.9	23.4	21.3	17.0	9.2	7.8	5.0	....	.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	141	4.5
XI	....	....	6.3	11.0	14.1	25.0	17.2	15.7	4.7	1.6	1.6	....	3.2	....	....	....	....	....	....	....	....	....	....	....	....	64	5.3
XII	....	2.6	7.7	10.3	18.0	27.0	16.7	10.3	5.2	....	....	2.6	....	....	....	....	....	....	....	....	....	....	....	....	....	78	5.4
XIII	....	....	9.3	13.2	21.1	29.0	7.9	13.2	4.0	1.4	1.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	76	5.2
XIV	....	....	....	....	....	....	16.0	....	31.6	21.1	21.1	5.3	....	5.3	....	....	....	....	....	....	....	....	....	....	....	19	2.3
XV	....	5.3	10.6	....	....	21.1	21.1	21.1	21.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	6.8
XVI	....	....	5.3	10.6	52.7	10.6	10.6	5.3	5.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	4.7
XVII	....	....	2.1	2.1	8.3	16.5	16.5	15.5	18.6	7.3	3.1	2.1	5.2	1.1	1.1	1.1	....	1.1	....	....	....	....	....	....	....	97	7.3
XVIII	....	....	4.7	9.4	18.8	23.5	15.7	23.5	4.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	64	5.7
XXI	3.6	2.2	18.7	22.3	18.7	16.6	11.5	5.1	....	1.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	139	4.2
Totals	1.2	3.2	7.7	13.9	17.3	19.4	15.0	11.0	6.0	2.4	9.0	.4	.7	.3	.1	.05	.05	....	....	....	....	....	....	....	....	1,897	5.3

TABLE IV. City distributions. Fourth grade. Multiplication. Speed. Mid-year scores. January, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	.6	5.4	21.1	23.5	19.9	14.5	10.3	2.4	.6	.6	....	....	.6	....	....	....	.6	....	....	....	....	....	....	....	....	166	3.9
II	49.3	11.3	19.8	7.1	4.3	4.3	1.5	1.5	....	....	....	....	....	....	....	....	1.5	....	....	....	....	....	....	....	....	71	1.1
III	....	....	5.0	30.0	17.5	30.0	17.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	40	4.9
IV	2.7	8.7	16.9	13.1	16.9	21.2	10.9	4.4	3.9	1.1	.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	184	4.5
V	....	2.7	15.8	12.5	18.5	16.9	20.1	8.2	3.3	.9	1.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	184	5.0
VI	8.0	8.0	23.1	15.4	8.0	8.0	15.4	8.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13	4.0
VII	9.0	19.0	16.0	19.0	3.2	13.0	19.0	3.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32	3.3
VIII	10.0	3.1	13.0	13.2	15.0	15.4	15.0	8.0	4.0	2.0	1.0	.9	.9	.1	....	....	.1	....	.1	....	....	....	....	....	.2	449	4.8
IX	11.2	22.3	55.6	11.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	9	2.4
X	6.0	4.0	20.0	22.3	21.0	13.0	7.4	3.0	2.2	.8	....	....	.8	....	....	....	....	.8	....	....	....	....	....	....	....	135	3.9
XI	1.7	3.2	17.2	21.9	18.9	18.9	9.4	4.7	....	3.2	....	....	....	....	....	....	1.7	....	....	....	....	....	....	....	....	64	4.3
XII	3.9	2.6	20.6	18.0	18.0	23.1	10.3	2.6	1.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	78	4.3
XIII	....	4.2	12.5	34.8	21.0	8.4	12.5	5.6	1.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	72	3.9
XIV	....	....	....	5.3	10.6	10.6	15.8	36.9	....	5.3	10.6	5.3	....	....	....	....	....	....	....	....	....	....	....	....	....	19	7.3
XV	....	....	5.3	15.8	31.6	36.9	5.3	5.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	5.0
XVI	....	....	31.6	21.1	47.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	4.0
XVII	5.2	1.1	2.1	9.3	7.3	15.5	24.8	11.4	2.1	8.3	6.2	3.1	....	3.1	1.1	....	....	....	....	....	....	....	....	....	....	97	6.4
XVIII	4.2	9.9	19.0	30.6	16.6	7.5	6.6	4.2	1.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	121	3.6
XXI	....	10.3	14.3	12.3	18.4	14.3	14.3	8.2	2.1	4.1	2.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	49	4.8
Totals	6.2	5.0	15.6	17.3	16.3	15.2	12.8	5.9	2.3	1.4	.9	.4	.3	.2	.06	....	.06	.3	.06	....	....	....	....	....	.1	1,821	4.4

TABLE V. City distributions. Fourth grade. Division. Speed. Mid-year scores. January, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	1.8	21.1	25.3	23.5	15.7	7.8	3.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	164	3.1
III	....	7.5	30.0	32.5	15.0	15.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	40	3.4
IV	6.5	21.7	19.6	22.3	17.9	7.6	3.3	1.1	....	....	....	.5	....	....	....	.5	....	....	....	....	....	....	....	....	....	186	3.1
V	....	17.3	20.0	21.1	18.4	13.5	5.4	2.2	1.6	....	....	.9	....	....	....	....	....	....	....	....	....	....	....	....	....	185	3.9
VI	8.0	46.2	30.8	15.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13	2.0
VII	9.0	31.3	25.0	22.0	9.0	....	3.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32	2.4
VIII	17.0	12.0	16.0	18.0	17.4	9.3	5.0	3.0	1.2	.7	.1	.5	.1	....	....	.1	....	.1	....	.1	....	....	....	....	....	420	3.3
XI	....	15.7	20.4	26.6	25.0	6.3	1.7	1.7	....	....	1.7	....	....	....	1.7	....	....	....	....	....	....	....	....	....	....	64	3.5
XII	3.9	21.8	15.4	20.6	23.1	12.9	1.3	1.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	78	3.4
XIII	....	23.1	30.8	35.9	7.7	2.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	39	1.9
XIV	....	....	10.6	26.4	26.4	26.4	5.3	....	....	5.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	4.6
XV	....	26.4	10.6	15.8	31.6	....	10.6	5.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	4.0
XVI	....	52.7	26.4	5.3	15.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	2.0
XVII	....	4.8	11.2	15.9	20.7	12.7	6.4	6.4	6.4	1.6	4.8	....	....	8.0	....	1.6	....	....	....	....	....	....	....	....	....	63	4.9
XXI	....	19.7	17.7	31.4	15.7	11.8	4.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	51	3.4
Totals	6.0	17.2	19.3	21.5	17.8	9.4	3.9	1.8	.9	.4	.3	.07	.4	.07	.2	.07	....	.07	....	.07	....	....	....	....	....	1,392	3.3

TABLE VI. City distributions. Fourth grade. Accuracy. Mid-year scores. January, 1915. Per cent of children making each score.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	.6	....	3.6	3.0	8.3	7.7	76.9	169	31
II	5.6	....	....	1.4	4.2	12.5	75.0	72	33
III	4.7	....	4.7	2.4	11.7	16.3	60.5	43	42
IV	2.2	....	5.4	2.2	6.5	9.7	74.2	186	30
V	11.7	....	5.6	5.0	8.3	13.3	56.1	180	44
VI	15.4	....	7.7	7.7	7.7	15.4	46.2	13	55
VII	3.2	....	....	6.3	9.4	15.7	65.7	32	38
VIII	7.6	....	6.4	5.3	9.7	14.0	57.3	478	44
IX	....	....	....	....	....	11.2	88.9	9	31
X	4.9	....	4.2	5.6	9.8	12.6	63.0	143	40
XI	1.6	....	4.7	7.9	15.7	14.1	56.3	64	44
XII	6.5	....	3.9	6.5	7.7	14.2	61.6	78	40
XIII	6.7	....	1.4	2.7	9.4	6.7	73.4	75	34
XIV	9.1	....	4.6	4.6	36.4	13.7	31.9	22	61
XV	21.1	....	5.3	21.1	....	15.8	36.9	19	70
XVI	....	....	....	....	....	15.8	84.3	19	31
XVII	5.2	1.1	12.4	10.4	14.5	12.4	44.4	97	55
XVIII	5.1	....	8.0	2.2	13.1	15.2	56.5	138	44
XXI	6.5	....	1.7	4.9	16.2	19.4	51.7	62	48
Totals	5.9	.05	5.2	4.7	9.8	12.8	61.8	1,894	41

SUBTRACTION.

	100	90	80	70	60	50	0–49	T.	M.
I	3.0	....	6.0	4.8	8.9	12.5	64.9	168	39
II	1.5	....	4.3	1.5	5.7	5.7	81.7	71	31
III	7.0	....	4.7	11.7	16.3	21.0	39.6	43	56
IV	5.9	....	7.0	3.8	8.1	10.2	65.1	186	34
V	18.9	....	14.6	9.2	19.8	11.9	34.6	185	64
VI	23.1	....	15.4	....	30.8	15.4	15.4	13	68
VII	6.3	....	12.5	3.2	22.0	18.8	32.5	32	57
VIII	9.3	.2	12.0	6.3	12.0	10.8	49.4	474	51
IX	....	....	....	....	11.2	11.2	77.8	9	36
X	7.8	....	8.5	2.9	7.1	14.2	59.6	141	42
XI	1.6	....	6.3	4.7	7.9	17.2	62.5	64	40
XII	11.6	....	10.3	14.2	10.3	9.0	44.9	78	56
XIII	10.6	....	6.6	9.3	10.6	5.3	57.9	76	43
XIV	21.1	5.3	26.4	5.3	5.3	15.8	21.1	19	82
XV	10.6	....	26.4	5.3	16.6	21.1	26.4	19	65
XVI	15.8	....	10.6	5.3	10.6	5.3	52.0	19	50
XVII	14.5	2.1	15.5	15.5	10.4	19.6	23.0	97	68
XVIII	11.5	....	7.2	3.6	6.5	9.4	61.9	139	41
XXI	9.4	....	9.4	17.2	7.9	13.5	43.8	64	55
Totals	9.4	.2	10.1	6.7	10.1	11.9	52.0	1,897	46

TABLE VII. City distributions. Fourth grade. Accuracy. Mid-year scores. January, 1915. Per cent of children making each score.

MULTIPLICATION.

	100	90	80	70	60	50	0–49	T.	M.
I	3.6	....	4.2	3.0	6.0	7.9	75.3	166	33
II	1.5	....	1.5	....	....	1.5	95.8	71	26
III	10.0	....	7.7	5.0	12.5	5.0	60.0	40	42
IV	2.2	....	4.4	3.3	5.4	9.7	74.2	184	30
V	20.1	....	10.9	7.1	12.0	13.0	37.0	184	60
VI	....	....	....	....	....	....	100.	13	25
VII	6.3	....	6.3	3.2	6.3	6.3	72.0	32	35
VIII	6.0	....	6.0	5.6	10.9	8.5	63.0	449	39
IX	44.5	....	....	....	....	11.2	44.5	9	100
X	6.7	....	3.7	6.7	9.7	17.8	55.6	135	45
XI	7.9	....	4.7	4.7	4.7	9.4	68.8	64	36
XII	5.2	....	6.5	3.9	9.0	20.6	55.2	78	46
XIII	8.4	....	5.6	7.0	8.4	12.6	58.4	72	43
XIV	21.1	5.3	36.9	5.3	10.6	5.3	15.8	19	84
XV	5.3	....	10.6	10.6	15.8	15.8	42.2	19	57
XVI	15.8	....	....	10.6	5.3	10.6	57.9	19	45
XVII	14.5	1.1	22.7	7.3	9.3	7.3	38.2	97	65
XVIII	14.9	....	2.5	8.3	10.8	5.8	57.9	121	44
XXI	10.3	....	14.3	6.2	6.2	10.3	53.1	49	48
Totals	8.5	.01	6.9	5.3	8.7	9.8	65.1	1,821	41

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	4.3	....	1.8	3.1	7.4	7.9	72.0	164	35
III	7.7	....	5.0	2.5	7.7	7.7	70.0	40	36
IV	7.5	2.2	3.8	1.6	8.1	4.8	72.0	186	31
V	25.9	....	7.0	2.2	7.0	12.4	45.4	185	54
VI	23.1	....	....	....	....	....	77.0	13	25
VII	6.3	....	....	....	9.4	21.9	62.5	32	40
VIII	9.0	....	5.0	4.1	4.3	6.7	71.6	420	35
XI	6.3	....	1.6	1.6	14.1	7.9	68.8	64	36
XII	16.7	....	....	5.2	10.3	9.0	59.0	78	42
XIII	12.9	....	....	....	10.3	12.9	64.2	39	40
XIV	63.2	....	5.3	....	....	5.3	26.4	19	100
XV	21.1	....	5.3	10.6	....	....	63.2	19	42
XVI	10.6	....	....	5.3	....	15.8	68.5	19	38
XVII	19.1	1.6	14.3	8.0	9.6	11.2	36.6	63	63
XVIII	....	....	....	....	....	....	....	....	....
XXI	29.5	....	4.0	5.9	9.9	9.9	41.2	51	60
Totals	12.9	1.5	4.3	3.3	6.9	8.4	63.5	1,892	39

TABLE VIII. City distributions. Fifth grade. Addition. Speed. Mid-year scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	1.2	2.3	4.0	9.2	17.2	20.7	16.7	13.8	9.2	3.5	1.7	.6														174	5.8
II	1.8	1.8	12.1	19.0	25.9	15.6	13.8	3.5	6.9																	58	4.6
III		2.8	5.5	2.8	8.2	29.8	19.0	16.3	8.2	2.8	5.5															37	6.1
IV			3.2	5.7	12.1	15.9	13.4	17.8	14.0	8.3	4.5	1.9	.7	.7	1.3		.7									157	7.0
V			1.6	6.5	23.4	21.2	21.7	13.0	5.4	1.6	3.3	1.1		.5	.5											184	5.9
VI			9.1	4.6	36.4	18.2	18.2	4.6		4.6	4.6															22	5.0
VII			3.8	7.5	11.2	29.7	14.9	22.3	3.8	7.5																27	6.0
VIII	.6	1.1	3.8	9.9	15.1	19.7	19.7	13.3	8.2	4.8	2.2	.8	.4			.1										721	6.0
IX			9.6	33.4	33.4	9.6	4.8	9.6																		21	4.3
X	1.5	.8	11.3	9.8	16.6	24.1	22.6	6.8	3.8	1.5	.8			.8												133	5.4
XI				13.1	8.7	33.4	20.4	7.3	10.2	4.4	1.5		1.5													69	5.9
XII		2.9	6.5	10.2	23.2	18.9	18.1	13.8	2.9	2.9	.7															138	5.4
XIII			3.4	13.6	13.6	22.1	27.2	6.8	1.7	10.2				1.7												59	5.9
XIV							16.7	16.7	33.4	11.2		16.7		5.6												18	8.5
XV					11.6	23.1	23.1	7.7	15.4	11.6	7.7															26	6.7
XVI			9.1		9.1	27.3	18.2	27.3	9.1																	11	6.5
XVII			1.1	2.1	3.2	6.3	15.7	12.5	24.0	9.4	11.5	6.3	4.2	2.1					2.1							96	8.4
XVIII		.8	4.1	11.4	13.9	19.5	19.5	11.4	13.9	4.1	.8					.8										123	6.0
XXI						6.5	19.4	32.3	19.4	6.5	9.7	3.3		3.3												31	7.8
Totals	.43	3.3	4.2	9.0	15.6	19.5	18.8	12.8	8.9	4.6	2.6	1.10	.43	.38	.19	.05	.05		.09							2,105	5.9

TABLE IX. City distributions. Fifth grade. Subtraction. Speed. Mid-year scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	.6	1.8	3.6	9.5	18.4	22.5	17.8	13.6	4.7	4.2	1.8	1.2	.6	....	....	....	....	....	....	....	....	....	....	....	169	6.7
II	....	....	5.2	10.4	12.1	27.6	22.5	12.1	8.7	....	1.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	58	5.8
III	....	....	2.9	2.9	5.8	17.2	14.3	20.0	14.3	8.6	8.6	5.8	....	....	....	....	....	....	....	....	....	....	....	....	....	35	7.4
IV	....	....	1.9	4.4	7.0	14.6	19.0	12.7	14.6	12.7	7.6	2.5	1.9	....	....	1.3	....	....	....	....	....	....	....	....	....	158	7.3
V	....	....	.5	3.3	8.7	10.4	17.9	22.4	20.7	8.2	1.6	3.3	1.6	....	.5	....	....	....	....	....	....	....	....	....	....	184	7.4
VI	....	9.1	4.6	4.6	9.1	27.3	13.7	22.8	4.6	4.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	22	5.8
VII	....	....	....	3.8	3.8	22.3	18.6	18.6	14.9	11.2	....	7.5	....	....	....	....	....	....	....	....	....	....	....	....	....	27	7.2
VIII	.8	.5	2.5	5.4	10.2	13.4	22.5	16.6	13.1	6.4	5.1	1.1	1.1	.7	.1	.4	....	....	....	....	....	....	....	....	....	724	6.8
IX	....	4.4	21.8	39.2	17.4	13.1	....	4.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	21	3.7
X	3.0	1.5	8.1	7.4	20.6	12.5	23.6	11.8	7.4	.8	3.0	.8	....	....	....	....	....	....	....	....	....	....	....	....	....	136	5.8
XI	....	....	1.5	10.2	10.2	14.5	26.1	13.1	13.1	4.4	2.9	2.9	1.5	....	....	....	....	....	....	....	....	....	....	....	....	69	6.6
XII	....	....	2.2	7.3	6.5	20.3	26.8	16.0	10.9	5.8	1.5	.7	1.5	.7	....	....	....	....	....	....	....	....	....	....	....	138	6.5
XIII	....	1.7	....	3.4	11.7	16.7	26.8	20.0	11.7	3.4	1.7	1.7	....	1.7	....	....	....	....	....	....	....	....	....	....	....	60	6.6
XIV	....	....	....	....	....	....	15.8	....	42.2	10.6	21.1	5.3	....	5.3	....	....	....	....	....	....	....	....	....	....	....	19	8.9
XV	3.9	....	....	....	11.6	19.3	27.0	7.7	15.4	7.7	7.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	26	6.6
XVI	....	....	....	9.1	18.2	....	27.3	18.2	27.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11	7.0
XVII	....	....	2.1	4.2	1.1	6.3	12.5	14.6	30.9	17.8	7.3	3.2	5.3	2.1	1.1	1.1	....	....	1.1	....	....	....	....	....	....	96	8.5
XVIII	.9	....	3.3	13.1	12.3	19.7	18.9	16.4	9.9	3.3	2.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	122	6.0
XXI	....	....	....	....	5.9	8.9	17.7	14.8	14.8	14.8	17.7	3.0	....	3.0	....	....	....	....	....	....	....	....	....	....	....	34	8.2
Totals	.5	.52	2.6	5.9	9.8	14.6	21.2	16.1	13.6	6.6	4.4	1.6	1.3	.88	.19	.19	....	....	.05	....	....	....	....	....	....	2,009	6.8

TABLE X. City distributions. Fifth grade. Multiplication. Speed. Mid-year scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	.6	1.7	4.6	11.4	26.9	25.7	14.9	8.0	5.1	.6	....	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	175	5.2
II	5.2	5.2	20.7	22.5	17.3	13.8	12.1	1.8	....	....	1.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	58	3.8
III	....	....	....	....	2.9	14.3	20.0	28.6	14.3	14.3	2.9	2.9	....	....	....	....	....	....	....	....	....	....	....	....	....	35	7.5
V	1.3	1.3	4.4	9.4	9.4	15.7	20.8	12.6	7.0	3.8	4.4	3.8	3.8	....	....	1.3	....	....	....	.6	....	....	....	....	.6	159	6.4
	....	....	.5	5.0	9.1	22.0	23.1	17.7	7.0	9.1	4.3	2.2	....	....	....	....	....	....	....	....	....	....	....	....	....	186	6.6
VI	....	9.1	9.1	18.2	27.3	22.8	9.1	....	4.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	22	4.5
VII	....	....	....	3.8	7.5	26.0	26.0	22.3	11.2	3.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	27	6.6
VIII	2.5	1.0	5.9	11.9	12.7	18.9	18.8	13.0	6.8	4.4	1.8	.7	.6	.7	....	.1	.1	....	....	.3	....	....	....	....	....	725	5.8
IX	....	15.4	53.8	15.4	20.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	2.7
X	1.6	.8	10.3	16.7	22.3	19.9	16.7	6.4	3.2	1.6	.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	126	4.9
XI	....	....	7.4	20.6	19.2	26.5	8.9	7.4	3.0	3.0	1.5	1.5	....	....	....	....	....	....	....	....	....	....	....	....	1.5	68	5.1
XII	....	4.4	14.5	15.2	19.6	18.1	15.2	8.0	3.6	1.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	138	4.8
XIII	....	1.7	3.4	5.1	13.6	22.1	30.6	17.0	3.4	1.7	1.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	59	6.2
XIV	....	....	....	5.8	10.6	5.3	21.1	36.9	....	5.3	10.6	5.3	....	....	....	....	....	....	....	....	....	....	....	....	....	19	7.3
XV	....	....	....	....	7.7	27.0	15.4	38.5	3.9	3.9	....	3.9	....	....	....	....	....	....	....	....	....	....	....	....	....	26	7.0
XVI	....	....	9.1	9.1	....	18.2	45.5	9.1	9.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11	6.4
XVII	....	....	3.2	3.2	3.2	11.5	16.7	12.6	17.8	11.5	5.3	7.3	4.2	1.1	....	1.1	....	1.1	....	....	....	....	....	....	....	96	7.9
XVIII	.9	3.3	9.9	20.5	18.1	25.4	14.0	5.8	2.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	122	4.9
XXI	....	....	....	....	5.9	11.8	32.4	8.9	20.6	8.9	8.9	....	....	....	....	....	....	3.0	....	....	....	....	....	....	....	34	7.0
Totals	1.2	1.4	6.6	11.4	14.3	19.6	18.4	12.8	6.5	3.6	1.8	1.4	.6	.3	....	.2	.1	.1	....	.1	....	....	....	....	.10	2,106	6.2

TABLE XI. City distributions. Fifth grade. Division. Speed. Mid-year scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	1.1	9.1	25.9	28.2	20.1	7.5	4.6	2.9	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	174	3.5
II	6.9	10.4	17.3	29.4	19.1	6.9	*3.5	3.5	3.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	58	3.5
III	8.6	5.8	17.2	8.6	14.3	22.9	17.2	5.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	35	4.8
IV	1.3	8.8	11.3	18.3	15.7	13.8	10.1	6.3	5.7	.6	3.2	1.3	1.9	.6	.6	....	.6	....	....	....	....	....	....	....	....	159	4.7
V	....	4.9	8.7	18.9	17.3	13.0	13.0	8.1	7.6	3.8	3.2	1.1	.5	....	....	....	....	....	....	....	....	....	....	....	....	185	5.0
VI	....	18.2	36.4	27.3	9.1	9.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	22	2.9
VII	....	26.0	22.3	14.9	11.2	11.2	7.5	3.8	....	3.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	27	3.3
VIII	4.7	9.7	17.2	19.6	18.1	11.1	8.9	4.3	2.2	1.9	.7	.7	.6	.3	....	....	....	....	....	.1	....	....	....	....	....	723	3.9
IX	4.8	38.1	33.4	9.6	14.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	21	2.3
X	4.2	9.1	20.7	23.2	23.2	9.9	4.2	2.5	2.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	121	3.7
XI	1.5	8.9	23.6	29.5	17.7	10.3	5.9	1.5	....	....	1.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	68	3.6
XII	4.4	19.6	23.2	23.9	9.4	13.1	2.2	1.5	2.2	....	....	.7	....	....	....	....	....	....	....	....	....	....	....	....	....	138	3.1
XIII	....	8.5	15.3	22.1	35.6	8.5	5.1	3.4	....	....	....	....	1.7	....	....	....	....	....	....	....	....	....	....	....	....	60	4.1
XIV	....	....	5.9	29.5	29.5	23.6	5.9	....	....	5.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	17	4.6
XV	....	3.9	....	11.6	31.0	30.8	11.6	3.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	26	5.1
XVI	....	....	18.2	9.1	54.6	9.1	....	9.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11	4.5
XVII	1.1	3.2	5.3	11.5	11.5	16.7	12.5	11.5	10.5	3.2	4.2	3.2	3.2	1.1	1.1	....	1.1	....	....	....	....	....	....	....	....	96	6.2
XVIII	7.3	9.0	18.7	26.9	18.7	11.4	3.3	2.5	.8	1.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	123	3.6
XXI	....	....	6.9	13.8	34.5	6.9	13.8	3.5	13.8	....	6.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	29	4.9
Totals	3.2	9.5	17.0	21.0	18.4	11.8	7.7	4.3	3.1	1.3	1.1	.62	.58	.19	.1	.05	.10	....	....	.05	....	....	....	....	....	2,093	4.0

TABLE XII. City distributions. Fifth grade. Accuracy. Mid-year scores, 1915. Per cent of children making each score.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	5.2	....	7.5	5.8	10.9	16.7	54.9	174	46
II	1.8	....	1.8	1.8	10.4	10.4	74.2	58	34
III	5.5	2.8	10.9	10.9	19.0	8.2	43.3	37	60
IV	3.8	....	10.2	8.9	13.4	12.1	51.6	157	49
V	13.0	.5	14.1	12.5	13.0	14.7	32.1	184	63
VI	....	....	9.1	4.6	9.1	13.7	63.7	22	39
VII	7.5	....	14.9	7.5	26.0	18.6	26.0	27	63
VIII	8.7	.4	8.6	6.9	12.2	16.4	46.8	721	52
IX	....	....	10.2	7.3	18.9	5.8	58.0	69	44
X	8.3	....	12.1	3.8	12.1	9.8	54.2	133	47
XI	....	....	10.2	7.3	18.9	5.8	58.0	69	44
XII	9.4	....	9.4	5.8	10.9	18.9	44.9	138	53
XIII	8.5	....	10.2	3.4	11.9	8.5	57.7	59	44
XIV	5.6	5.6	38.9	....	27.8	11.2	11.2	18	80
XV	11.6	....	23.1	....	23.1	19.3	23.1	26	63
XVI	9.1	....	9.1	9.1	27.3	18.2	27.3	11	63
XVII	14.6	4.2	23.0	18.8	8.4	6.3	25.0	96	76
XVIII	7.4	....	10.6	9.0	11.4	13.0	48.8	123	51
XXI	....	....	3.3	13.0	9.7	13.0	61.3	31	42
Totals	7.8	.52	11.0	7.6	12.7	14.0	47.0	2,105	52

SUBTRACTION.

	100	90	80	70	60	50	0–49	T.	M.
I	4.2	2.4	17.2	9.5	13.0	9.5	44.4	169	56
II	5.2	....	24.2	6.9	13.8	10.4	39.7	58	60
III	14.3	....	20.0	11.5	20.0	5.8	28.6	35	69
IV	7.0	1.3	15.8	7.0	15.2	18.4	35.5	158	58
V	29.4	.5	20.7	13.6	12.5	10.3	13.0	184	80
VI	13.7	....	22.8	4.6	....	....	59.1	22	42
VII	....	3.8	29.7	14.9	18.6	14.9	18.6	27	70
VIII	11.5	1.8	16.0	10.9	13.0	14.0	32.9	724	62
IX	9.6	....	4.8	....	19.1	19.1	47.7	21	53
X	11.1	1.5	8.8	10.3	9.6	14.7	44.1	136	54
XI	54.4	1.5	13.1	13.1	14.5	14.5	39.2	69	58
XII	15.2	....	21.0	9.4	10.9	14.5	29.0	138	66
XIII	6.7	1.7	16.7	13.4	10.0	11.7	40.0	60	59
XIV	21.1	5.3	26.4	5.3	15.8	5.3	21.1	19	82
XV	15.4	....	27.0	3.9	3.9	34.7	15.4	26	60
XVI	36.4	....	18.2	18.2	9.1	....	18.2	11	85
XVII	26.1	6.3	16.7	14.6	9.4	6.3	20.9	96	76
XVIII	9.9	....	9.9	7.4	14.8	14.8	43.5	122	54
XXI	5.9	3.0	20.6	14.8	11.8	11.8	32.4	34	63
Totals	12.5	1.5	16.5	11.0	12.8	13.1	32.9	2,109	63

TABLE XIII. City distributions. Fifth grade. Accuracy. Mid-year scores, 1915. Per cent of children making each score.

MULTIPLICATION.

	100	90	80	70	60	50	0–49	T.	M.
I	8.6	....	4.6	8.6	14.3	13.2	45.7	175	53
II	12.1	....	5.2	5.2	5.2	6.9	65.6	58	38
III	14.3	....	17.2	8.6	25.8	8.6	25.8	35	67
IV	4.4	1.3	16.4	7.6	15.7	14.5	40.3	159	57
V	15.6	2.2	21.0	12.4	12.9	14.5	21.5	186	71
VI	9.1	....	9.1	13.7	9.1	....	59.1	22	42
VII	14.9	....	11.2	11.2	14.9	22.3	26.0	27	63
VIII	10.9	.5	12.4	10.1	13.7	16.4	36.0	725	59
IX	....	....	....	10.0	....	25.0	65.0	20	37
X	8.0	.8	9.6	9.6	10.3	11.1	50.8	126	49
XI	10.3	....	3.0	1.5	13.3	10.3	61.8	68	40
XII	13.8	....	8.7	6.5	10.2	15.2	45.7	138	53
XIII	5.1	....	15.3	3.4	11.9	15.2	49.3	59	51
XIV	21.1	5.3	26.3	5.3	10.6	5.3	15.8	19	84
XV	3.9	....	15.4	3.9	11.6	20.8	34.7	26	55
XVI	27.3	....	....	9.1	45.5	18.2	....	11	68
XVII	23.0	2.1	21.9	14.6	11.5	9.4	17.8	96	78
XVII	8.2	....	10.7	2.5	9.0	13.1	56.6	122	44
XXI	3.0	3.0	8.9	8.9	14.8	17.7	42.2	34	53
Totals	10.8	7.1	12.3	8.7	12.8	14.8	40.1	2,106	57

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	8.1	....	1.7	4.0	9.8	16.1	60.4	174	41
II	10.4	....	3.5	3.5	13.8	13.8	55.2	58	45
III	11.5	....	11.5	5.8	11.5	11.5	48.6	35	53
IV	10.7	1.3	10.7	7.6	10.7	11.4	47.8	159	52
V	27.0	1.1	15.7	11.4	15.1	8.7	21.1	185	75
VI	31.9	....	....	4.6	9.1	18.8	31.9	22	58
VII	11.2	....	14.9	3.8	11.2	3.8	55.6	27	47
VIII	16.7	.3	8.4	6.8	7.1	10.2	50.5	723	49
IX	....	....	....	....	....	4.8	95.3	21	28
X	17.4	....	4.2	5.0	9.1	12.4	52.1	121	48
XI	10.3	....	3.0	4.5	7.4	13.3	61.8	68	40
XII	25.4	....	2.9	2.2	11.6	12.3	38.4	138	59
XIII	11.7	....	3.4	8.4	1.7	18.4	56.7	60	44
XIV	70.6	....	5.9	....	....	11.8	11.8	17	100
XV	19.3	....	11.6	3.9	23.1	11.6	30.8	26	63
XVI	27.3	....	....	45.5	9.1	18.2	....	11	76
XVII	25.0	4.2	29.9	5.3	10.5	6.3	28.2	96	80
XVII	15.5	....	2.5	8.1	13.0	9.0	53.1	123	48
XXI	24.2	3.5	3.5	13.8	....	13.8	41.4	29	58
Totals	17.4	.53	7.7	6.5	9.4	11.3	47.2	2,093	52

TABLE XIV. City distributions. Sixth grade. Addition. Speed. Mid-year scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	2.1	4.9	16.1	13.3	2.6	22.4	11.9	9.8	4.2	.7	1.4	....	....	....	....	....	.7	....	....	....	....	....	....	143	7.1
II	....	....	1.7	11.9	22.1	23.1	23.9	6.8	1.7	3.4	....	....	1.7	....	....	....	....	....	....	....	....	....	....	....	....	59	5.7
III	....	....	....	4.0	20.0	20.0	24.0	16.0	12.0	4.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	25	6.8
IV	....	.8	....	1.5	4.4	8.8	13.3	14.7	19.1	11.1	11.8	6.6	3.0	1.5	.8	.8	.8	....	.8	....	.8	....	....	....	....	136	8.3
V	....	....	.6	1.8	9.3	19.2	25.6	14.0	13.4	10.5	2.3	1.2	2.3	....	....	....	....	....	....	....	....	....	....	....	....	172	6.8
VI	....	....	....	3.6	17.9	25.0	25.0	10.8	14.3	....	3.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	28	6.1
VII	....	....	2.7	5.3	5.3	13.2	21.1	13.2	23.7	2.7	10.6	2.7	....	....	....	....	....	....	....	....	....	....	....	....	....	38	7.2
VIII	....	.1	1.3	3.4	9.3	14.3	18.4	18.1	16.6	8.6	6.0	1.6	1.3	.5	.1	.1	....	....	....	....	....	....	....	....	....	614	7.2
X	1.7	....	3.5	8.6	13.2	18.4	21.3	14.9	10.9	2.3	3.5	1.7	....	....	....	....	....	....	....	....	....	....	....	....	....	174	6.2
XI	....	....	1.6	4.7	6.4	17.2	18.8	25.0	12.5	1.6	7.9	4.7	....	....	....	....	....	....	....	....	....	....	....	....	....	64	7.1
XII	....	....	....	7.3	16.2	16.2	22.4	12.1	13.6	4.8	4.8	.8	....	1.6	....	....	....	....	....	....	....	....	....	....	....	125	6.5
XIII	....	....	....	4.7	9.4	14.1	28.2	14.1	18.8	3.2	4.7	....	3.2	....	....	....	....	....	....	....	....	....	....	....	....	64	6.8
XIV	....	....	....	....	....	....	7.2	42.9	14.3	7.2	....	7.2	....	....	....	....	....	....	....	....	....	....	....	....	....	14	8.0
XV	....	....	....	4.0	12.0	8.0	24.0	20.0	8.0	8.0	8.0	....	....	8.0	....	....	....	....	....	....	....	....	....	....	....	25	7.2
XVI	....	....	....	5.6	11.2	16.7	27.8	16.7	22.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	18	6.6
XVII	....	....	....	....	1.2	2.3	8.9	13.4	23.4	10.9	16.7	5.6	5.6	3.4	2.3	....	3.4	2.3	....	1.2	1.2	....	....	....	....	90	9.1
XVIII	.8	....	.8	1.6	6.3	14.2	18.9	17.4	11.1	11.8	8.7	4.8	1.6	1.6	.8	....	....	....	....	....	....	....	....	....	....	127	7.5
XXI	....	....	....	2.5	4.9	17.1	26.9	17.1	12.2	9.8	4.9	4.9	....	....	....	....	....	....	....	....	....	....	....	....	....	41	7.0
Totals	.20	.10	1.1	4.0	10.0	14.6	19.5	16.5	14.8	7.5	6.1	2.2	1.4	.77	.26	.10	.26	.10	.10	.10	.10	....	....	....	....	1,957	7.0

TABLE XV. City distributions. Sixth grade. Subtraction. Speed. Mid-year scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	1.4	3.6	7.2	10.7	17.2	19.3	16.4	15.0	3.6	3.6	1.4	....	.9	....	....	....	....	....	....	....	....	....	140	8.5
II	....	....	1.7	11.9	10.2	22.1	30.6	10.2	6.8	3.4	3.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	59	6.2
III	....	....	4.0	4.0	....	12.0	20.0	24.0	20.0	16.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	25	7.5
IV	....	....	....	1.5	.8	6.6	14.7	13.3	18.4	15.5	14.0	11.1	.8	....	.8	.8	....	2.2	....	....	....	....	....	....	....	136	8.7
V	....	....	....	.6	1.7	8.7	8.7	19.7	15.6	14.5	13.9	9.3	1.2	4.1	2.3	....	....	....	....	....	....	....	....	....	....	173	8.3
VI	....	....	....	....	....	7.2	32.2	32.2	17.9	7.2	....	3.6	....	....	....	....	....	....	....	....	....	....	....	....	....	28	7.2
VII	....	....	2.7	....	....	5.3	15.8	26.4	13.2	7.9	18.5	10.6	....	....	....	....	....	....	....	....	....	....	....	....	....	38	8.0
VIII	....	.5	.8	1.0	3.4	10.6	16.2	19.6	19.6	10.3	6.4	4.9	4.1	1.6	.5	.7	.1	.1	....	....	....	....	....	....	....	614	7.8
X	....	1.2	2.3	5.8	8.6	13.8	20.1	15.5	17.8	8.1	3.5	1.2	1.7	.6	....	....	....	....	....	....	....	....	....	....	....	174	6.9
XI	....	....	....	4.7	12.5	9.4	32.9	14.1	11.0	4.7	9.4	1.6	....	....	....	....	....	....	....	....	....	....	....	....	....	64	6.7
XII	....	....	....	1.6	5.6	8.1	14.4	20.2	30.2	11.3	7.3	4.8	4.1	3.3	....	....	....	....	....	....	....	....	....	....	....	125	8.0
XIII	....	....	....	....	....	3.3	21.0	27.5	17.8	15.0	11.3	3.3	1.7	....	....	....	....	....	....	....	....	....	....	....	....	62	7.9
XIV	....	....	....	....	....	....	14.3	7.2	7.2	28.6	7.2	21.5	14.3	....	....	....	....	....	....	....	....	....	....	....	....	14	9.3
XV	....	....	....	....	....	4.0	16.0	20.0	12.0	24.0	8.0	12.0	....	4.0	....	....	....	....	....	....	....	....	....	....	....	25	9.0
XVI	....	....	....	5.6	5.6	11.2	27.8	....	27.8	5.6	16.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	18	8.0
XVII	....	....	....	1.2	1.2	2.3	6.7	13.4	11.2	15.6	7.8	15.6	11.2	6.7	2.3	....	2.3	1.2	1.2	....	1.2	....	....	....	....	90	9.9
XVIII	.8	.8	....	.8	2.4	8.0	22.3	11.9	23.0	9.6	7.2	10.3	....	.8	.8	1.6	....	....	....	....	....	....	....	....	....	126	8.1
XXI	....	....	....	....	7.7	10.3	12.9	7.7	33.4	12.9	5.2	2.6	5.2	....	....	2.6	....	....	....	....	....	....	....	....	....	39	8.4
Totals	.05	.3	.61	2.2	4.1	9.0	16.4	17.2	17.8	11.4	8.2	5.8	2.5	1.6	.56	.45	.20	.25	.05	....	.05	....	....	....	....	1,950	7.9

TABLE XVI. City distributions. Sixth grade. [Multiplication. Speed. Mid-year scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	1.5	....	.7	7.2	8.7	20.2	20.2	13.7	10.1	7.9	5.8	2.9	....	.7	.7	....	....	....	....	....	....	....	....	....	139	7.6
II	....	5.1	15.4	15.4	15.4	22.1	20.4	5.1	....	1.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	59	5.0
III	....	....	4.0	4.0	16.0	28.0	20.0	20.0	4.0	4.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	25	6.0
IV	....	....	2.2	3.7	5.9	10.4	16.3	15.6	9.7	15.6	8.2	5.2	3.7	1.5	.8	....	.8	.8	....	....	....	....	....	....	....	135	7.8
V	....	....	....	.6	1.2	4.1	13.4	18.0	18.6	10.5	13.4	5.8	5.2	2.9	3.5	2.3	....	....	.6	....	....	....	....	....	....	172	8.7
VI	....	....	3.6	3.6	14.3	17.9	35.8	14.3	10.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	28	6.3
VII	....	....	....	2.7	5.3	10.6	15.8	26.4	26.4	7.9	5.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	38	7.6
VIII	1.6	.6	.8	3.5	5.6	13.7	19.5	17.0	12.7	10.2	6.8	3.8	1.9	1.4	.95	.6	.6	....	....	.6	....	....	....	....	....	630	7.3
X	3.6	....	5.4	11.3	19.7	23.2	17.3	11.3	4.2	3.6	....	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	168	5.4
XI	....	....	1.6	1.6	4.8	20.7	15.9	33.4	6.4	8.0	4.8	1.6	1.6	....	....	....	....	....	....	....	....	....	....	....	....	63	7.2
XII	....	....	2.4	8.8	8.0	10.4	21.6	15.2	12.0	10.4	8.8	1.6	....	....	.8	....	....	....	....	....	....	....	....	....	....	125	6.9
XIII	....	....	....	....	5.0	20.0	28.4	21.7	11.7	8.4	3.4	1.7	....	....	....	....	....	....	....	....	....	....	....	....	....	60	6.9
XIV	....	....	....	....	....	7.2	7.2	14.3	7.2	7.2	28.6	....	14.3	7.2	....	....	....	7.2	....	....	....	....	....	....	....	14	10.3
XV	....	....	....	....	....	12.0	36.0	8.0	20.0	12.0	4.0	4.0	....	....	4.0	....	....	....	....	....	....	....	....	....	....	25	7.5
XVI	....	....	....	....	....	16.7	16.7	33.4	....	16.7	11.2	....	5.6	....	....	....	....	....	....	....	....	....	....	....	....	18	7.5
XVII	....	....	....	....	3.4	2.3	14.5	15.6	7.8	18.9	12.3	8.9	5.6	5.6	1.2	3.4	....	1.2	....	....	....	....	....	....	....	90	9.4
XVIII	.8	....	3.2	2.4	6.4	16.7	31.8	20.7	5.6	5.6	3.2	2.4	....	2.4	....	....	....	....	....	....	....	....	....	....	....	126	6.7
XXI	....	....	....	8.2	10.9	5.5	32.5	10.9	10.9	10.9	5.5	2.8	2.8	....	....	....	....	....	....	....	....	....	....	....	....	37	6.8
Totals	.87	.30	1.8	4.0	7.0	13.2	20.6	17.2	11.0	9.5	6.0	3.4	2.0	1.2	.87	.46	.10	.15	.05	.05	....	....	....	....	....	1,952	7.2

TABLE XVII. City distributions. Sixth grade. Division. Speed. Mid-year scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	.7	2.9	13.0	10.1	15.8	13.0	15.8	15.8	6.5	5.1	.7	....	.7	....	....	....	....	....	....	....	....	....	....	....	139	6.6
II	1.7	15.4	30.6	23.8	15.4	5.1	6.8	1.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	59	6.1
III	4.0	4.0	8.0	32.0	24.0	16.0	8.0	....	....	....	4.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	25	4.2
IV	....	.8	4.5	15.6	19.3	18.5	12.6	7.4	11.9	3.0	.8	1.5	3.7	.8	....	....	....	....	....	....	....	....	....	....	....	135	5.6
V	....	.6	1.7	5.8	11.0	22.6	9.8	8.1	16.2	3.5	6.9	1.7	3.5	5.2	2.3	....	1.2	....	....	....	....	....	....	....	....	173	6.9
VI	....	3.6	10.8	32.2	20.3	3.6	10.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	28	4.1
VII	....	....	....	21.1	23.7	21.1	13.4	5.3	10.6	....	2.7	....	2.7	....	....	....	....	....	....	....	....	....	....	....	....	38	5.3
VIII	1.9	1.9	6.7	13.2	21.1	19.2	12.1	7.1	7.3	2.7	2.7	2.1	1.3	....	.6	.6	3.2	....	....	....	....	....	....	....	....	630	5.1
X	3.6	4.9	9.1	20.6	24.9	12.7	10.3	6.7	3.6	.6	.6	.6	2.0	....	....	....	....	....	....	....	....	....	....	....	....	165	4.5
XI	....	1.6	....	11.2	38.1	15.9	14.4	8.0	3.2	4.8	3.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	63	5.0
XII	....	1.6	9.6	15.2	22.4	20.0	14.4	3.2	6.0	2.4	.8	.8	2.4	.8	....	.8	....	....	....	....	....	....	....	....	....	125	5.1
XIII	....	1.7	5.0	23.4	23.4	20.0	15.0	6.7	3.4	....	....	....	1.7	....	....	....	....	....	....	....	....	....	....	....	....	60	4.9
XIV	....	....	....	14.3	14.3	7.2	21.5	14.3	22.0	....	....	....	....	7.2	....	....	....	....	....	....	....	....	....	....	....	14	6.7
XV	....	....	12.0	....	28.0	12.0	8.0	8.0	8.0	....	4.0	4.0	8.0	....	4.0	4.0	....	....	....	....	....	....	....	....	....	25	6.0
XVI	....	....	5.6	5.6	27.8	22.3	11.2	16.7	....	11.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	18	5.5
XVII	....	1.2	....	8.9	4.5	14.5	13.4	11.2	10.0	4.5	6.7	6.7	7.8	3.4	6.7	....	1.2	....	....	....	....	....	....	....	....	90	7.7
XVIII	.8	1.6	5.6	24.8	20.8	17.6	9.6	4.8	3.0	1.6	3.2	....	.8	.8	....	....	....	....	....	....	....	....	....	....	....	125	4.9
XXI	....	2.8	5.6	11.2	8.4	16.7	19.5	5.6	8.4	8.4	11.2	2.8	....	....	....	....	....	....	....	....	....	....	....	....	....	36	6.4
Totals	1.0	2.1	6.2	15.0	19.6	17.5	12.0	7.3	8.2	2.7	2.9	1.4	1.9	.88	.62	.15	.25	....	....	....	....	....	....	....	....	1,948	5.3

TABLE XVIII. City distributions. Sixth grade. Accuracy. Mid-year scores, 1915. Per cent of children making each score.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	6.8	....	7.0	11.9	14.0	21.0	39.9	143	55
II	....	....	3.4	8.5	8.5	17.0	62.8	59	41
III	8.0	....	4.0	....	20.0	24.0	44.0	25	53
IV	5.2	.8	18.4	14.0	19.1	14.7	28.0	136	64
V	9.9	1.8	18.6	12.2	16.3	12.2	29.1	172	65
VI	3.6	....	7.2	10.8	17.9	14.3	46.5	28	53
VII	18.5	....	18.5	2.7	21.1	7.9	31.6	38	65
VIII	8.6	.8	9.8	10.9	15.3	14.8	39.7	614	57
X	6.9	1.7	12.7	10.4	9.8	17.8	40.8	174	55
XI	26.6	4.7	21.9	11.0	15.7	7.9	12.5	64	81
XII	14.4	1.6	8.8	10.4	13.6	21.6	29.6	125	59
XIII	4.7	1.6	11.0	6.3	14.1	17.2	45.4	64	53
XIV	....	....	35.8	....	7.2	35.8	21.5	14	58
XV	4.0	4.0	16.0	8.0	12.0	20.0	36.0	25	58
XVI	5.6	....	11.2	5.6	33.4	11.2	33.4	18	62
XVII	7.8	6.7	12.3	12.3	15.6	16.7	28.9	90	63
XVIII	10.3	3.2	16.6	6.3	16.0	19.7	27.6	127	62
XXI	4.9	2.5	17.1	4.9	7.4	22.0	41.5	41	54
Totals	8.7	1.5	12.5	10.8	15.0	16.4	36.1	1,957	59

SUBTRACTION

	100	90	80	70	60	50	0–49	T.	M.
I	14.3	2.9	17.8	13.5	11.4	14.9	24.8	140	69
II	3.5	....	13.6	8.5	23.8	13.6	32.3	59	62
III	8.0	....	16.0	16.0	20.9	12.0	28.0	25	66
IV	13.3	9.6	26.5	15.5	10.3	12.5	12.5	136	79
V	26.6	6.9	23.7	13.9	13.3	8.7	6.9	173	83
VI	10.8	....	21.5	14.3	14.3	17.9	21.5	28	68
VII	29.0	10.6	10.6	13.2	10.6	10.6	15.8	38	80
VIII	12.7	3.4	16.6	12.9	13.1	14.3	26.4	614	67
X	12.1	2.3	14.4	13.8	13.1	13.2	32.2	174	52
XI	18.8	3.2	28.2	7.9	18.8	9.4	14.1	64	80
XII	15.6	2.2	15.6	14.8	14.8	10.4	19.8	125	72
XIII	8.1	....	25.9	23.6	14.6	8.1	21.0	62	73
XIV	14.3	14.3	14.3	21.5	7.2	14.3	14.3	14	77
XV	20.0	....	36.0	8.0	12.0	4.0	20.0	25	82
XVI	5.6	11.2	16.7	16.7	22.3	5.6	22.3	18	70
XVII	17.8	10.0	18.9	20.0	16.7	10.0	6.7	90	78
XVIII	19.9	4.8	22.3	15.9	12.7	8.8	15.9	126	78
XXI	7.7	5.2	7.7	28.3	20.6	15.4	15.4	39	70
Total	15.1	4.3	18.9	14.5	14.0	12.8	21.1	1,950	72

TABLE XIX. City distributions. Sixth grade. Accuracy. Mid-year scores, 1915. Per cent of children making each score.

MULTIPLICATION.

	100	90	80	70	60	50	0–49	T.	M.
I	9.4	4.3	14.4	19.4	10.1	16.6	25.9	139	68
II	10.2	....	10.2	....	15.3	11.9	52.6	59	48
III	4.0	....	16.0	16.0	16.0	12.0	36.0	25	63
IV	10.4	3.0	20.8	12.6	17.1	15.6	20.8	135	68
V	19.2	6.4	19.2	23.8	14.5	11.6	5.2	172	78
VI	10.8	....	25.0	3.6	17.9	10.8	32.2	28	64
VII	31.6	....	21.1	18.5	10.6	10.6	7.9	38	81
VIII	12.4	2.7	17.3	11.1	15.6	12.4	28.3	630	66
X	15.5	....	8.9	12.5	16.7	10.7	35.7	168	63
XI	31.8	3.2	19.1	14.3	11.2	11.2	9.6	63	83
XII	12.8	4.8	18.4	17.6	16.8	10.4	19.2	125	72
XIII	10.0	....	20.0	10.0	11.7	16.7	31.7	60	61
XIV	....	7.2	14.3	21.5	21.5	7.2	28.6	14	67
XV	28.0	8.0	20.0	16.0	16.0	4.0	8.0	25	84
XVI	11.2	5.6	33.4	11.2	11.2	5.6	22.3	18	80
XVII	11.2	10.0	15.6	30.0	15.6	13.4	14.5	90	73
XVIII	21.5	1.6	23.1	9.6	11.1	13.5	19.9	126	77
XXI	13.6	5.5	21.7	8.2	13.6	8.2	29.8	37	70
Totals	14.3	3.2	17.5	13.7	14.7	12.5	24.2	1,952	69

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	21.6	....	14.4	10.1	11.5	11.5	31.0	139	67
II	33.9	....	1.7	10.2	5.1	13.6	35.6	59	63
III	32.0	....	12.0	4.0	8.0	8.0	36.0	25	70
IV	19.3	2.2	15.6	11.9	15.6	9.7	25.9	135	69
V	37.0	4.1	23.7	8.1	12.1	5.8	9.3	173	86
VI	25.0	....	3.6	3.6	14.3	32.2	21.5	28	59
VII	36.9	2.7	13.2	13.2	21.1	7.9	5.3	38	82
VIII	19.5	2.1	15.9	8.6	11.6	10.5	31.9	630	67
X	26.7	....	7.9	4.9	12.7	10.9	37.0	165	62
XI	38.2	....	14.3	15.9	12.7	9.6	9.6	63	82
XII	17.6	....	12.8	9.6	16.0	19.2	24.8	125	64
XIII	11.7	1.7	8.4	10.0	18.4	11.7	38.4	60	60
XIV	14.3	7.2	21.5	14.3	14.3	7.2	21.5	14	75
XV	24.0	4.0	12.0	24.0	12.0	8.0	16.0	25	76
XVI	27.8	....	11.2	11.2	16.7	11.2	22.3	18	70
XVII	31.2	10.0	21.2	13.4	11.2	2.3	11.2	90	86
XVIII	29.6	2.4	16.8	10.4	12.0	5.6	23.2	125	79
XXI	25.0	2.8	22.3	5.6	8.4	8.4	27.8	36	80
Totals	24.6	2.0	15.0	9.4	12.6	10.3	26.5	1,948	71

TABLE XX. City distributions. Seventh grade. Addition. Speed. Mid-year scores, January, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	.7	2.9	13.1	16.7	20.3	18.1	13.1	5.8	6.5	.7	1.5	.7	....	....	....	....	....	....	....	....	....	....	138	7.8
II	3.1	1.6	1.6	4.5	18.5	15.4	20.3	10.8	9.3	1.6	3.1	1.6	....	....	....	....	....	....	....	....	....	....	....	....	....	65	6.2
III	....	....	....	....	6.3	15.7	18.8	9.4	18.8	18.8	6.3	....	6.3	....	....	....	....	....	....	....	....	....	....	....	....	32	8.0
IV	....	....	1.6	.9	4.1	16.2	14.5	17.0	13.7	9.7	8.9	6.5	2.4	.9	.9	2.4	....	.9	....	....	....	....	....	....	....	124	7.8
V	....	....	....	.7	3.5	10.6	12.0	14.1	17.6	16.9	7.8	8.5	4.2	.7	1.4	.7	....	....	....	....	....	.7	....	....	.7	142	8.5
VI	....	....	6.4	3.2	6.4	12.5	18.8	18.8	21.9	9.4	....	....	....	3.2	....	....	....	....	....	....	....	....	....	....	....	32	7.2
VII	....	....	....	....	....	4.0	28.1	18.0	8.0	32.0	12.0	....	4.0	4.0	....	....	....	....	....	....	....	....	....	....	....	25	9.1
VIII	.5	.2	.4	2.0	6.0	9.3	17.3	15.0	20.5	13.0	7.4	3.4	1.3	1.7	.7	.5	.4	....	....	.2	....	....	....	.2	....	713	7.9
X	2.4	.8	3.1	4.7	12.4	19.4	21.0	15.5	11.7	5.5	1.6	1.6	....	.8	....	....	....	....	....	....	....	....	....	....	....	129	6.4
XI	....	....	....	....	....	6.3	8.4	18.8	23.0	12.5	10.5	10.5	8.4	2.1	....	....	....	....	....	....	....	....	....	....	....	48	8.7
XII	....	....	....	4.3	3.2	10.6	17.9	22.2	19.0	10.6	6.4	2.2	3.2	1.1	....	....	....	....	....	....	....	....	....	....	....	95	7.7
XIII	....	....	2.4	2.4	16.3	21.0	16.3	11.7	16.3	2.4	7.0	4.7	....	....	....	....	....	....	....	....	....	....	....	....	....	43	6.6
XIV	....	....	....	....	....	....	....	23.1	7.7	15.4	15.4	30.8	7.7	....	....	....	....	....	....	....	....	....	....	....	....	13	10.5
XV	....	....	....	....	4.6	....	13.7	4.6	31.9	9.1	18.2	4.6	9.1	4.6	....	....	....	....	....	....	....	....	....	....	....	22	8.9
XVI	....	....	....	....	11.2	33.4	11.2	11.2	11.2	22.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	9	7.0
XVII	....	....	....	....	2.4	4.8	6.0	13.1	21.5	14.3	13.1	7.2	4.8	6.0	2.4	1.2	2.4	1.2	....	....	....	....	....	....	....	84	9.2
XVIII	1.0	....	....	1.0	2.0	7.0	17.9	24.8	16.9	8.0	7.0	9.0	2.0	2.0	2.0	....	....	....	....	....	....	....	....	....	....	101	7.9
XXI	....	....	....	....	3.0	3.0	26.5	11.8	23.6	14.8	5.9	5.9	3.0	....	....	....	....	3.0	....	....	....	....	....	....	....	34	8.3
Totals	.5	.2	.7	1.9	5.8	11.0	16.9	16.0	18.3	12.0	6.9	4.7	2.1	1.6	.7	.5	.3	.2	....	.05	....	.05	....	.05	.05	1,849	7.8

TABLE XXI. City distributions. Seventh grade. Subtraction. Speed. Mid-year scores. January, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I					.7	3.6	4.4	13.1	18.9	19.6	14.5	10.2	5.1	5.1	3.6	.7	.7									138	9.5
II					4.5	18.5	23.1	20.1	17.0	9.3	3.1	3.1		1.6												65	7.2
III					6.1	9.1	24.3	15.2	12.2	15.2	15.2	3.1														33	7.8
IV			.9		.9	2.5	9.9	11.5	12.3	14.0	8.3	7.4	4.9	2.5	.9	3.3	5.8	.9			.9			1.7		122	10.0
V				.7		2.1	5.5	9.6	13.0	11.7	15.8	13.7	11.7	5.5	4.8	2.1	1.4	.7		.7				.7	.7	146	10.5
VI						12.5	12.5	18.8	31.3	6.4	9.4	3.2	6.4													32	8.2
VII							20.0	4.0	4.0	8.0	36.0	16.0			4.0	8.0										25	10.4
VIII	.7		.3	.6	1.3	3.7	9.2	11.0	19.1	13.7	14.7	8.8	5.9	5.4	1.7	1.2	1.2	.8	.1		.1	.1				680	9.3
X	1.6	.8	.8	3.1	3.8	13.0	20.6	13.0	13.8	7.7	11.5	5.4	1.6		.8	1.6									.3	131	7.5
XI			2.1			8.4	2.1	8.4	27.1	15.8	16.7	10.5	2.1	2.1				2.1								48	9.1
XII	1.1					2.2	9.5	13.7	12.7	15.8	22.2	8.5	3.2	4.3	2.2	2.2		1.1		1.1				1.1		95	9.7
XIII						9.4	16.3	11.7	21.0	18.7	11.7	7.0	2.4	2.4												43	8.7
XIV								7.7	7.7	30.8		15.4	15.4	15.4	7.7											13	11.5
XV							13.7	9.1	4.6	22.8	27.3	4.6	13.2													22	10.0
XVI								22.3		22.3	44.5	11.2														9	10.3
XVII						3.6	7.2	12.0	15.5	14.3	9.6	10.8	12.0	3.6	3.6	3.6		2.4			2.4					84	9.8
XVIII	1.0					4.0	7.0	24.8	23.8	9.9	14.9	7.0	3.0	3.0	1.0	1.0										101	8.6
XXI							8.9	20.6	14.8	14.8	14.8	8.9	8.9		3.0		5.9									34	9.4
Totals	.5	.06	.3	.5	1.2	5.0	10.1	12.7	17.4	13.7	14.3	8.9	5.5	4.0	2.0	1.3	.9	.9	.11	.11	.2	.11		.22	.11	1,821	9.2

TABLE XXII. City distribution. Seventh grade. Multiplication. Speed. Mid-year scores. January, 1915. Percent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	....	.8	6.4	10.2	13.3	18.8	17.2	14.1	4.7	6.3	5.5	2.4	1.6	....	.8	.8	....	....	....	....	....	....	128	9.2
II	....	1.6	3.1	13.9	20.0	26.2	21.6	3.1	9.3	1.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	65	5.5
III	....	....	3.1	....	....	15.2	18.2	9.1	18.2	15.2	12.2	6.1	3.1	....	....	....	....	....	....	....	....	....	....	....	....	33	8.3
IV	....	....	1.6	1.6	4.0	5.6	12.8	17.6	12.8	14.4	5.6	5.6	3.2	1.6	4.0	.8	4.0	.8	.8	.8	.8	....	2.0	....	....	125	8.6
V	....	....	....	....	1.3	3.9	9.2	4.6	14.4	17.0	15.0	12.4	5.9	7.2	6.6	.7	.7	....	....	....	....	....	....	....	1.8	153	10.0
VI	....	....	....	....	6.5	9.7	35.5	13.0	3.3	16.2	13.0	3.3	....	....	....	....	....	....	....	....	....	....	....	....	....	31	7.0
VII	....	....	....	....	8.0	4.0	8.0	8.0	8.0	16.0	20.0	8.0	12.0	4.0	4.0	....	....	....	....	....	....	....	....	....	....	25	10.0
VIII	1.4	....	.3	.6	3.0	5.4	10.6	15.4	17.9	13.7	12.4	7.9	4.9	3.0	2.4	1.8	.3	.3	....	.1	.3	....	....	....	....	709	8.8
X	1.7	.9	3.3	6.6	11.5	8.2	22.2	12.3	18.1	8.2	4.9	.9	....	.9	....	....	....	....	....	....	....	....	....	....	....	122	6.8
XI	....	....	....	2.1	....	12.5	4.2	20.9	10.5	14.6	4.2	16.7	10.5	2.1	2.1	....	....	....	....	....	....	....	....	....	....	48	9.8
XII	....	....	....	....	1.1	6.4	17.9	20.0	17.9	10.6	4.3	3.2	2.2	1.1	1.1	2.2	....	....	1.1	....	....	....	....	....	1.1	95	8.3
XIII	....	....	....	2.4	4.7	14.0	18.7	18.7	21.0	11.7	7.0	....	....	....	....	....	2.4	....	....	....	....	....	....	....	....	43	7.6
XIV	....	....	....	....	....	....	....	15.4	7.7	7.7	7.7	7.7	....	7.7	30.8	7.7	9.7	....	....	....	....	....	....	....	....	13	14.0
XV	....	....	....	....	....	4.6	18.2	27.4	13.7	4.6	18.2	9.1	4.6	....	....	....	....	....	....	....	....	....	....	....	....	22	8.0
XVI	....	....	....	....	....	....	....	22.3	44.5	....	11.2	11.2	11.2	....	....	....	....	....	....	....	....	....	....	....	....	9	8.8
XVII	....	....	1.2	1.2	4.8	2.4	15.5	14.3	8.4	19.1	10.8	9.6	2.4	6.0	3.6	1.2	....	....	....	....	....	....	....	....	....	84	9.1
XVIII	4.0	....	....	....	6.9	8.9	19.7	23.6	13.8	4.9	9.9	5.9	3.0	....	....	....	....	....	....	....	....	....	....	....	....	102	7.5
XXI	....	....	....	5.9	3.0	8.9	29.5	26.5	8.9	5.9	3.0	....	8.9	....	....	....	....	....	....	....	....	....	....	....	....	34	7.1
Totals	.9	.1	.7	1.5	4.1	6.8	13.8	14.9	15.3	12.8	10.4	6.7	4.2	2.8	2.5	1.2	.4	.2	.16	.11	.16	....	.11	....	.16	1,841	8.5

TABLE XXIII. City distributions. Seventh grade. Division. Speed. Mid-year scores. January, 1915. Percent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I				.8	5.5	13.3	16.4	14.1	18.8	11.0	6.3	6.3	1.6	6.4	2.4											128	8.0
II	3.1	7.7	12.4	26.2	29.3	4.7	7.7	1.6	3.1	4.7																65	4.0
III		3.1	6.1	12.2	15.2	12.2	33.4	3.1	9.1	3.1	3.1															33	6.1
IV		1.6	1.6	4.0	8.0	15.2	10.4	12.6	12.8	4.0	5.6	3.2	3.2	4.0	.8	3.2	1.6	1.6	.8		.8					125	7.6
V			.7	2.6	7.9	13.1	15.0	9.8	17.7	9.2	5.9	3.9	9.2	2.6	.7		.7								1.3	153	8.1
VI			3.2	9.4	22.0	21.9	15.7	12.5	6.3	6.3	3.2															32	5.9
VII		4.0	4.0	4.0	20.0	16.0	8.0		12.0	12.0	4.0	12.0		4.0												25	6.5
VIII	1.4	1.1	1.1	7.9	10.0	14.4	14.2	12.0	13.5	8.2	5.5	3.5	2.8	2.5	.7	.3	.6	.1			.1					710	7.0
X		1.7	9.9	16.4	11.5	13.2	14.0	9.9	10.7	4.9	3.3	2.5	.9		1.7											122	5.8
XI			2.1		6.3	12.5	10.5	20.9	10.5	8.4	14.6	8.4	2.1	2.1	2.1											48	7.9
XII	1.1		2.2	9.5	12.7	15.8	12.7	10.6	14.8	7.4	8.5	2.2	1.1			1.1			1.1							95	6.8
XIII				11.7	28.0	16.3	16.3	9.4	9.4	2.4	2.4		4.7													43	5.7
XIV				7.7			7.7	7.7	15.4	15.4	7.7	23.1	7.7	7.7												13	10.0
XV					9.1	13.7	9.1	4.6	31.9		18.2	4.6	9.1													22	8.4
XVI				11.2	22.3	22.3	22.3	11.2	11.2																	9	6.0
XVII		1.2	1.2	4.8	14.3	14.3	8.4	12.0	13.2	9.6	2.4	3.6	10.8	2.4	2.4											84	7.5
XVIII	4.0	2.0	1.0	11.8	17.7	18.7	11.8	7.9	10.8	4.9	5.9	1.0	2.0	1.0												102	5.7
XXI				8.9	14.8	11.8	17.7	17.7	17.7			5.9	3.0	3.0												34	6.8
Totals	.9	1.2	2.2	7.9	11.7	14.1	13.7	11.4	13.4	7.2	5.4	3.5	3.3	2.1	.8	.3	.3	.1	.1		.1				.1	1.843	6.9

TABLE XXIV. City distributions. Seventh grade. Accuracy. Mid-year scores. January, 1915. Percent of children making each score.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	2.2	1.5	5.8	2.9	17.4	15.2	55.1	138	45
II	7.7	3.1	7.7	6.2	7.7	23.1	44.7	65	53
III	3.2	....	25.0	6.3	18.8	18.8	28.1	32	62
IV	8.1	3.3	11.3	13.7	18.6	14.5	30.7	124	63
V	5.7	4.2	14.8	17.6	21.1	14.1	22.6	142	66
VI	15.7	....	15.7	15.7	21.9	12.5	18.8	32	69
VII	4.0	4.0	12.0	12.0	28.0	24.0	16.0	25	64
VIII	6.6	2.1	12.3	12.9	15.3	17.2	33.5	713	59
X	6.3	....	11.7	8.6	8.6	12.4	52.7	129	48
XI	12.5	....	37.5	18.8	8.4	10.5	12.5	48	80
XII	6.4	....	13.7	14.8	14.8	17.9	32.7	95	60
XIII	....	....	23.3	14.0	9.4	23.3	30.3	43	59
XIV	....	....	15.4	30.8	7.7	23.1	23.1	13	70
XV	....	....	9.1	9.1	27.3	31.9	22.8	22	59
XVI	11.2	....	55.6	....	....	11.2	22.3	9	84
XVII	8.4	4.8	17.9	15.5	12.0	12.0	29.8	84	67
XVIII	6.0	3.0	11.9	13.9	10.9	16.9	37.7	101	58
XXI	11.8	....	8.9	11.8	14.8	17.7	35.3	34	58
Totals	6.7	2.1	14.1	13.1	14.6	16.5	33.2	1,849	63

SUBTRACTION.

	100	90	80	70	60	50	0–49	T.	M.
I	5.8	2.9	20.3	16.7	15.2	18.1	21.0	138	67
II	12.4	1.6	20.0	9.3	17.0	13.9	26.2	65	66
III	18.2	6.1	21.3	15.2	15.2	12.2	12.2	33	78
IV	14.8	9.9	24.6	18.9	9.0	9.9	13.1	122	79
V	20.6	14.4	17.8	17.1	16.5	6.2	7.6	146	82
VI	18.8	3.2	40.7	6.3	12.5	3.2	15.7	32	83
VII	8.0	8.0	16.0	24.0	28.0	4.0	12.0	25	73
VIII	17.1	5.7	24.0	15.3	13.7	11.6	12.6	680	78
X	10.7	7.7	15.3	13.0	16.1	16.8	20.6	131	68
XI	27.1	12.5	16.7	12.5	14.6	4.2	12.5	48	84
XII	16.9	14.8	23.2	15.8	11.6	5.3	12.7	95	82
XIII	16.3	2.4	37.3	21.0	4.7	....	18.7	43	82
XIV	15.4	7.7	30.8	7.7	7.7	7.7	23.1	13	80
XV	4.6	4.6	13.7	18.2	22.8	13.7	22.8	22	60
XVI	33.4	11.2	....	11.2	22.3	....	22.3	9	90
XVII	10.8	13.2	19.1	27.4	13.2	7.2	9.6	84	77
XVIII	13.9	9.0	18.9	18.9	9.9	16.9	12.9	101	76
XXI	17.7	8.9	11.8	8.9	8.9	14.8	29.5	34	67
Totals	15.4	7.6	21.8	16.0	13.7	11.0	14.6	1,821	77

TABLE XXV. City distributions. Seventh grade. Accuracy. Mid-year scores. January, 1915. Percent of children making each score.

MULTIPLICATION

	100	90	80	70	60	50	0–49	T.	M.
I	7.1	.8	18.0	18.8	16.4	14.9	24.2	128	67
II	13.9	....	17.0	6.2	15.4	7.7	40.0	65	63
III	24.3	3.1	18.2	12.2	15.2	12.2	15.2	33	78
IV	8.8	3.2	27.2	21.6	10.4	15.2	13.6	125	75
V	14.4	8.5	30.1	18.3	13.1	9.8	5.9	153	81
VI	13.0	3.3	32.3	9.7	16.2	13.0	13.0	31	80
VII	8.0	8.0	20.0	20.0	12.0	12.0	20.0	25	74
VIII	14.8	5.9	23.0	15.1	13.5	13.0	14.7	709	76
X	14.0	....	18.1	8.2	14.0	12.3	33.6	122	63
XI	33.4	....	27.1	10.5	4.2	10.5	14.6	48	84
XII	14.2	3.6	14.2	18.9	15.3	14.2	20.0	95	71
XIII	16.3	....	25.6	14.0	16.3	9.4	18.7	43	75
XIV	7.7	15.4	7.7	30.8	7.7	15.4	15.4	13	75
XV	18.2	9.1	18.2	9.1	22.8	18.2	4.6	22	75
XVI	22.3	....	33.4	33.4	....	....	11.2	9	83
XVII	19.1	3.6	9.6	20.3	10.8	16.7	20.3	84	71
XVIII	12.8	4.9	22.6	13.8	10.8	14.8	21.6	102	72
XXI	26.5	....	23.6	8.9	11.8	3.0	26.5	34	80
Totals	14.6	4.6	22.0	15.4	13.3	12.7	17.8	1,841	74

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	19.6	4.7	21.9	14.1	14.1	9.4	16.4	128	77
II	10.8	....	12.4	6.2	13.9	15.4	41.6	65	54
III	30.4	3.1	18.2	3.1	18.2	15.2	12.2	33	82
IV	33.6	8.8	18.4	8.0	10.4	8.8	12.0	125	86
V	30.8	5.9	28.1	13.1	8.5	8.5	5.2	153	85
VI	31.3	....	34.4	18.8	3.2	6.3	6.3	32	85
VII	28.0	8.0	28.6	12.0	8.0	12.0	4.0	25	86
VIII	26.8	4.5	18.9	12.4	12.3	8.3	16.9	710	80
X	23.0	3.3	9.9	8.2	11.5	14.0	30.4	122	65
XI	48.0	4.2	14.6	8.4	6.3	8.4	10.5	48	95
XII	27.4	2.2	24.3	9.5	13.7	12.7	10.6	95	82
XIII	32.6	2.4	9.4	11.7	18.7	14.0	11.7	43	76
XIV	7.7	15.4	30.8	23.1	....	15.4	7.7	13	83
XV	36.4	4.6	31.9	13.7	4.6	....	9.1	22	87
XVI	55.6	....	11.2	11.2	11.2	11.2	....	9	100
XVII	34.6	8.4	19.1	8.4	6.0	8.4	15.5	84	86
XVIII	31.4	8.0	16.7	11.8	15.7	4.0	17.7	102	81
XXI	29.5	....	30.6	14.8	14.8	5.9	14.8	34	80
Totals	28.2	4.5	19.7	11.0	11.8	9.3	16.2	1,843	81

TABLE XXVI. City distributions. Eighth grade. Addition. Speed. Mid-year scores. January, 1915. Percent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	1.1	3.1	3.1	7.2	9.2	15.4	**23.0**	10.3	13.3	9.2	....	3.1	1.1	2.1	....	....	....	....	....	....	....	....	98	9.5
II	....	....	....	6.0	8.0	10.0	17.4	**25.0**	10.0	17.4	6.0	....	....	2.0	....	....	....	....	....	....	....	....	....	....	....	52	7.4
III	....	....	....	....	....	3.4	17.0	13.4	**20.0**	13.4	20.0	....	7.0	7.0	....	....	....	....	....	....	....	....	....	....	....	30	8.9
IV	....	....	1.0	....	2.0	10.0	10.0	13.3	**19.0**	15.1	8.0	8.0	7.0	4.0	3.0	2.0	1.0	....	....	....	....	....	....	....	....	106	8.8
V	....	....	....	....	2.0	4.0	4.0	12.1	22.0	**22.4**	16.0	9.0	4.0	4.3	....	2.0	.9	....	.9	....	....	....	....	....	....	116	9.3
VI	....	....	....	....	....	26.4	5.3	**26.4**	21.1	....	11.0	5.3	....	....	....	5.3	....	....	....	....	....	....	....	....	....	19	7.0
VII	....	....	....	4.2	8.4	....	17.0	**25.0**	17.0	13.0	4.2	13.0	....	....	....	....	....	....	....	....	....	....	....	....	....	24	7.8
VIII	.1	....	.4	.6	2.0	7.0	10.0	12.4	**19.3**	18.3	11.0	7.0	5.2	3.2	3.0	.6	.6	.4	.1	.1	....	....	.1	....	....	498	8.9
IX	....	....	....	4.2	4.2	29.2	13.0	**25.0**	8.4	8.4	4.2	....	4.2	....	....	....	....	....	....	....	....	....	....	....	....	24	7.0
X	.7	....	.7	1.4	2.0	5.3	19.0	**24.0**	19.0	9.4	9.0	5.0	3.0	....	3.0	....	.7	....	....	....	....	....	....	....	....	150	7.9
XI	....	....	....	....	....	....	12.0	15.4	15.4	**25.0**	21.2	4.0	4.0	....	....	2.0	2.0	....	....	....	....	....	....	....	....	52	9.3
XII	....	....	1.4	.7	6.0	14.1	16.0	**18.3**	17.0	11.0	9.2	4.0	3.0	....	1.4	....	....	....	....	....	....	....	....	....	....	142	7.7
XIII	....	....	....	....	....	6.0	19.0	19.0	**19.0**	6.0	6.0	8.2	16.3	....	....	3.0	....	....	....	....	....	....	....	....	....	37	8.4
XIV	....	....	....	....	....	....	7.0	7.0	20.0	7.0	**20.9**	7.0	13.4	7.0	....	7.0	7.0	....	....	....	....	....	....	....	....	15	10.7
XV	....	....	....	....	....	....	8.0	8.0	23.1	**23.1**	23.1	....	8.0	8.0	....	....	....	....	....	....	....	....	....	....	....	13	9.7
XVI	....	....	....	....	....	....	18.2	**46.0**	27.3	9.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11	7.8
XVII	....	....	....	....	1.3	3.0	5.1	10.2	14.0	17.0	**18.0**	10.2	9.0	9.0	5.1	1.3	3.0	1.3	....	....	....	....	....	....	....	79	10.1
XVIII	....	....	1.4	4.1	3.0	7.0	19.0	**18.0**	15.0	11.0	16.3	6.0	....	1.4	....	....	....	....	....	....	....	....	....	....	....	74	7.9
XXI	....	....	....	....	....	7.0	7.0	7.0	17.3	**17.3**	28.0	10.4	7.0	....	....	....	....	....	....	....	....	....	....	....	....	29	9.8
Totals	.12	....	.4	.9	2.4	7.1	11.5	15.6	17.8	16.0	11.0	6.6	4.9	2.3	1.8	.83	.8	.19	.12	.06	....	....	.06	....	....	1,569	8.7

TABLE XXVII. City distributions. Eighth grade. Subtraction. Speed. Mid-year scores. January, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	....	....	....	1.1	5.2	6.2	11.4	10.4	15.0	14.0	22.0	6.2	1.1	3.1	1.1	2.1	....	2.1	1.1	....	....	....	97	12.1
II	....	2.0	....	4.0	4.0	6.0	22.3	22.3	13.0	15.0	8.0	4.0	2.0	....	....	....	....	....	....	....	....	....	....	....	....	54	7.6
III	....	....	....	....	....	7.0	3.4	10.0	20.0	17.0	10.0	10.0	17.0	3.4	....	....	3.4	....	....	....	....	....	....	....	....	30	9.6
IV	....	....	....	....	....	1.0	5.0	7.0	11.0	12.0	16.4	10.0	6.0	6.0	6.0	1.0	8.0	5.0	3.0	1.0	4.0	....	....	....	1.0	104	10.9
V	....	....	....	....	.9	....	....	9.4	13.0	8.0	19.0	12.0	16.3	8.0	5.2	2.0	3.0	2.0	2.0	....	2.0	....	....	....	....	117	11.1
VI	....	....	....	....	....	5.3	11.0	11.0	5.3	26.4	21.1	11.0	5.3	5.3	....	....	....	....	....	....	....	....	....	....	....	19	9.6
VII	....	....	....	....	....	4.2	4.2	8.4	17.0	25.0	17.0	4.2	8.4	13.0	....	....	....	....	....	....	....	....	....	....	....	24	9.7
VIII	.4	.1	.1	.4	.8	1.4	4.4	6.0	11.3	12.0	14.3	14.0	13.0	5.2	6.0	3.2	2.4	2.0	2.2	1.4	.8	.1	.4	....	....	497	10.9
IX	....	....	....	....	4.2	13.0	17.0	17.0	25.0	13.0	13.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	24	8.0
X	....	....	....	.7	3.0	2.0	13.3	16.0	19.0	16.0	9.4	8.0	5.0	5.0	2.0	1.4	.7	....	....	....	....	....	....	....	....	150	8.8
XI	....	....	....	4.0	2.0	2.0	8.0	12.0	17.4	12.0	23.1	12.0	6.0	2.0	2.0	....	....	....	....	....	....	....	....	....	....	52	9.5
XII	....	....	....	....	4.0	....	5.0	9.1	11.2	11.0	18.0	13.3	13.0	11.2	1.4	3.0	....	1.4	1.4	....	....	....	....	....	.7	143	10.6
XIII	....	....	....	....	....	....	6.0	6.0	14.0	14.0	6.0	3.0	16.3	19.0	3.0	6.0	6.0	3.0	....	3.0	....	....	....	....	....	37	12.3
XIV	....	....	....	....	....	....	7.0	....	13.4	....	20.0	40.0	....	....	13.4	7.0	....	....	....	....	....	....	....	....	....	15	11.3
XV	....	....	....	....	....	....	....	8.0	....	23.1	15.4	31.0	15.4	8.0	....	....	....	....	....	....	....	....	....	....	....	13	11.3
XVI	....	....	....	....	....	....	9.1	27.3	9.1	....	27.3	18.2	....	....	....	9.1	....	....	....	....	....	....	....	....	....	11	10.3
XVII	....	....	....	....	....	....	....	3.0	14.0	15.2	11.4	15.2	10.2	13.0	5.1	4.0	4.0	3.0	1.3	....	....	1.3	1.3	....	....	79	11.5
XVIII	....	....	....	....	....	....	6.0	8.2	29.0	12.2	14.0	12.2	6.0	8.2	3.0	1.4	1.4	3.0	....	....	....	....	....	....	....	74	9.7
XXI	....	....	....	....	....	....	4.0	....	14.0	10.4	17.3	21.0	14.0	7.0	7.0	....	7.0	....	....	....	....	....	....	....	....	29	11.3
Totals	.12	.12	.06	.32	1.1	1.4	5.7	8.3	13.6	12.4	14.4	12.1	10.3	7.4	4.0	2.2	2.3	1.6	1.2	.7	.7	.12	.19	....	.12	1,569	10.5

TABLE XXVIII. City distributions. Eighth grade. Multiplication. Speed. Mid-year scores. January, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I							6.2	11.4	5.2	9.3	15.0	19.0	10.4	14.0	4.2	3.1	3.1			1.0						97	11.2
II			2.0	2.0	10.0	19.0	25.0	13.3	13.3	6.0	8.0	4.0														58	6.8
III			3.4		3.4			10.0	23.4	10.0	17.0	17.0	7.0		3.4	3.4		3.4								30	10.0
IV			1.0		2.0	3.0	3.0	5.0	13.0	7.4	9.3	13.0	9.3	8.4	7.4	7.0		1.0	4.0	5.0	2.0		1.0	1.0		108	11.6
V					.9		3.0	6.1	4.4	16.0	24.0	9.0	11.3	5.3	7.0	2.0	7.0	4.4			9	9				115	10.9
VI							16.0	5.3	26.4	21.1	21.1	5.3				5.3										19	9.3
VII					4.2	4.2		13.0	29.2	8.4	17.0	8.4	13.0	4.2												24	9.0
VIII	2.3		.4	.1	.8	2.0	6.0	8.0	10.0	13.0	13.4	14.0	10.3	8.0	5.2	4.0	2.0	1.3	.8	.4	.4	.1		.1	.1	477	10.7
IX					4.2	21.0	25.0	8.4	17.0	13.0	8.4	4.2														24	7.0
X	3.0	1.4	1.4	.7	6.0	14.3	20.0	18.0	14.3	11.0	5.0	3.4		3.0				.7								147	7.3
XI							14.0	12.0	14.0	16.0	22.0	12.0	4.0	4.0			2.0		2.0							51	9.8
XII			9	.9	4.0	8.0	9.1	13.3	10.0	14.1	6.0	12.4	5.0	4.0	6.0	.9	2.0	2.0	.9	3.0	.9	.9				121	9.4
XIII						3.0	3.0	8.2	16.3	14.0	19.0	3.0	16.3	8.2	3.0	3.0		3.0	3.0							37	10.4
XIV							7.0	7.0	7.0	7.0	13.4	33.4		13.4			7.0	7.0								15	11.4
XV						8.0		8.0	16.0	16.0	31.0	16.0		8.0												13	10.3
XVI						9.1	9.1	9.1		9.1	9.1	36.4	9.1					9.1								11	11.3
XVII						3.0	8.0	6.4	18.0	17.0	10.2	17.0	5.1	11.4	3.0	1.3		3.0								79	10.0
XVIII					1.4	1.4	16.3	22.0	12.2	19.0	20.3	3.0	1.4	3.0	1.4											74	8.8
XXI						4.0	4.0	7.0	14.0	14.0	10.4	17.4	17.4	4.0	10.4											29	11.0
Totals	.99	.13	.53	.3	1.98	.42	8.6	10.3	11.7	12.8	13.2	11.3	7.4	6.0	3.9	2.2	1.5	1.3	.7	.7	.4	.2	.06	.13	.06	1,524	10.9

TABLE XXIX. City distributions. Eighth grade. Division. Speed. Mid-year scores. January, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	....	1.1	5.2	4.2	9.3	20.0	12.4	11.4	15.0	11.4	5.2	3.1	1.1	2.1	....	....	....	....	....	....	....	....	97	9.9
II	....	6.0	6.0	23.0	23.0	15.1	8.0	2.0	8.0	10.0	2.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	53	4.8
III	3.4	....	....	7.0	10.0	13.4	17.0	....	20.0	10.0	....	3.4	7.0	7.0	....	3.4	....	....	....	....	....	....	....	....	....	30	8.0
IV	.9	....	.9	.9	4.0	11.0	14.0	10.0	12.0	2.0	6.0	7.3	14.0	9.1	4.0	2.0	2.0	....	.9	.9	....	....	....	....	.9	110	8.8
V	....	....	....	.9	....	6.4	9.1	7.3	11.0	14.0	11.0	6.4	18.2	9.1	.9	5.0	2.0	....	....	....	....	....	....	....	....	110	10.2
VI	....	5.3	....	5.3	11.0	11.0	5.3	11.0	26.4	....	11.0	11.0	....	....	....	....	....	....	5.3	....	....	....	....	....	....	19	8.2
VII	....	....	4.2	8.4	4.2	17.0	21.0	13.0	17.0	....	8.4	....	....	8.4	....	....	....	....	....	....	....	....	....	....	....	24	6.8
VIII	2.3	.1	1.1	2.1	3.0	10.3	9.4	10.0	12.4	9.4	11.3	5.2	10.0	5.0	3.0	2.0	1.3	1.1	.6	.4	.4	.4	....	....	....	477	8.9
IX	....	....	....	21.0	13.0	17.0	13.0	17.0	13.0	4.2	....	....	4.2	....	....	....	....	....	....	....	....	....	....	....	....	24	6.0
X	1.4	.7	5.0	6.1	17.0	17.0	12.3	8.0	15.0	5.0	6.0	3.0	3.0	.7	....	.7	.7	....	....	....	....	....	....	....	.7	147	6.3
XI	....	....	....	2.0	....	4.0	14.0	12.0	18.0	10.0	6.0	6.0	22.0	....	4.0	4.0	....	....	....	....	....	....	....	....	....	51	9.2
XII	....	....	1.0	3.0	10.0	22.0	13.0	6.0	12.0	8.0	8.0	5.0	5.0	6.0	....	....	1.0	1.0	....	....	....	....	....	....	....	101	7.3
XIII	....	....	....	....	3.0	8.2	11.0	11.0	11.0	19.0	8.2	8.2	11.0	3.0	6.0	3.0	....	....	....	....	....	....	....	....	....	37	9.4
XIV	....	....	....	....	....	13.4	13.4	7.0	27.0	....	....	13.4	13.4	....	....	7.0	....	7.0	....	....	....	....	....	....	....	15	8.8
XV	....	....	....	....	8.0	16.0	16.0	16.0	8.0	8.0	8.0	....	8.0	16.0	....	....	....	....	....	....	....	....	....	....	....	13	8.0
XVI	....	....	....	....	9.1	9.1	....	....	18.2	27.3	18.2	9.1	....	....	9.1	....	....	....	....	....	....	....	....	....	....	11	9.7
XVII	....	....	....	3.0	5.1	4.0	10.2	15.2	20.3	9.0	6.4	5.1	6.4	8.0	1.3	4.0	4.0	....	....	....	....	....	....	....	....	79	8.7
XVIII	....	....	....	....	3.0	8.2	3.0	12.2	22.0	18.0	15.0	10.0	10.0	1.4	....	....	....	....	....	....	....	....	....	....	....	74	9.2
XXI	....	....	....	....	....	4.0	14.0	7.0	21.0	7.0	17.4	14.0	7.0	4.0	7.0	....	....	....	....	....	....	....	....	....	....	29	10.0
Totals	1.0	.04	1.2	3.2	5.5	10.9	10.2	9.2	14.2	9.1	8.9	6.0	8.4	4.7	1.7	1.6	1.3	.05	.03	.02	.01	.01	....	....	.01	1,501	8.6

TABLE XXX. City distributions. Eighth grade. Accuracy. Mid-years cores. January, 1915. Per cent of children making each score.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	4.1	5.2	12.3	12.3	10.3	16.4	40.0	98	56
II	4.0	2.0	10.0	14.0	12.0	10.0	50.0	52	50
III	3.4	3.4	10.0	17.0	17.0	20.0	30.0	30	60
IV	8.0	4.0	17.0	17.0	17.0	13.3	25.0	106	67
V	9.0	5.2	27.0	16.4	12.1	16.4	15.0	116	74
VI	....	11.0	11.0	11.0	21.1	16.0	32.0	19	63
VII	4.2	....	25.0	21.0	4.2	17.0	29.2	24	70
VIII	9.0	4.2	16.1	15.0	19.1	16.0	21.1	498	65
IX	4.2	4.2	17.0	....	21.0	8.4	46.0	24	55
X	6.0	2.0	14.0	17.0	13.0	19.0	30.0	150	61
XI	21.0	8.0	25.0	15.1	13.3	6.0	11.4	52	82
XII	6.4	....	9.2	18.3	17.0	18.3	31.0	142	60
XIII	....	....	16.4	11.0	16.4	20.0	27.1	87	58
XIV	13.4	13.4	13.4	20.0	20.0	13.4	7.0	15	77
XV	8.0	8.0	8.0	....	15.4	23.1	39.0	13	57
XVI	9.1	....	....	9.1	9.1	36.4	36.4	11	55
XVII	6.4	9.0	23.0	13.0	15.2	17.0	18.0	79	71
XVIII	12.2	6.0	18.0	12.2	14.0	11.0	28.4	74	68
XXI	4.0	7.0	21.0	17.3	21.0	10.4	21.0	29	70
Totals	7.6	4.1	16.3	14.9	15.9	16.0	25.8	1,569	65

SUBTRACTION.

	100	90	80	70	60	50	0–49	T.	M.
I	9.3	6.2	18.0	24.0	12.4	16.0	16.0	97	73
II	6.0	4.0	8.0	17.0	22.3	22.3	22.3	54	63
III	....	10.0	27.0	17.0	10.0	17.0	20.0	30	72
IV	16.4	17.4	26.0	18.3	11.0	8.0	4.0	104	84
V	23.1	15.0	21.0	17.1	9.4	8.0	8.0	117	84
VI	16.0	5.3	32.0	21.1	11.0	11.0	5.3	19	82
VII	17.0	13.0	21.0	17.0	21.0	4.2	8.4	24	80
VIII	16.3	15.1	25.0	15.0	12.0	9.1	9.0	497	82
IX	17.0	....	38.0	13.0	8.4	8.4	17.0	24	81
X	14.0	4.0	21.3	18.0	13.0	13.4	17.0	150	74
XI	25.0	15.1	25.0	11.4	10.0	11.4	2.0	52	86
XII	14.0	20.0	18.0	14.0	16.1	11.2	15.4	143	76
XIII	14.0	16.4	16.4	19.0	11.0	16.4	8.2	87	75
XIV	7.0	13.4	13.4	20.0	13.4	20.0	13.4	15	73
XV	8.0	15.4	31.0	23.1	15.4	....	8.0	13	83
XVI	27.3	18.2	9.1	18.2	....	....	27.3	11	90
XVII	23.0	19.0	22.0	13.0	11.4	6.4	6.4	79	86
XVIII	19.0	12.2	23.0	14.0	8.2	7.0	8.2	74	84
XXI	4.0	21.0	24.2	28.0	10.4	4.0	10.4	29	80
Totals	15.7	12.7	23.6	16.4	12.2	10.3	10.7	1,569	80

TABLE XXXI. City distributions. Eighth grade. Accuracy. Mid-year scores. January, 1915. Per cent of children making each score.

MULTIPLICATION.

	100	90	80	70	60	50	0–49	T.	M.
I	2.1	8.3	12.4	19.0	17.0	15.0	28.0	97	65
II	4.0	....	11.4	15.1	13.3	17.0	40.0	53	57
III	....	10.0	10.0	20.0	17.0	17.0	27.0	30	64
IV	10.2	13.0	26.0	24.1	12.1	4.0	11.2	108	79
V	15.0	12.2	27.0	17.4	13.1	13.1	2.0	115	82
VI	32.0	5.3	26.4	16.0	5.3	....	16.0	19	86
VII	8.4	17.0	29.2	33.4	4.2	8.4	....	24	82
VIII	15.0	14.0	23.1	19.0	14.0	7.1	9.0	477	81
IX	8.4	....	25.0	4.2	25.0	8.4	29.2	24	65
X	10.2	1.4	17.0	14.3	13.6	12.3	32.0	147	65
XI	30.0	16.0	20.0	16.0	8.0	6.0	6.0	51	88
XII	16.0	8.3	23.2	17.4	19.0	7.0	10.0	121	79
XIII	8.2	3.0	30.0	22.0	22.0	11.0	6.0	37	77
XIV	....	13.4	27.0	27.0	20.0	....	13.4	15	78
XV	....	....	46.2	8.0	23.1	8.0	15.4	13	80
XVI	18.2	27.3	9.1	27.3	18.2	....	....	11	90
XVII	17.0	6.4	27.0	11.4	17.0	11.4	11.4	79	80
XVIII	22.0	6.0	30.0	18.0	12.2	4.1	10.0	74	82
XXI	7.0	14.0	31.1	24.2	7.0	....	17.3	29	81
Totals	13.0	9.8	22.8	18.0	14.2	8.6	13.8	1,524	77

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	14.0	18.0	28.0	16.0	8.3	8.3	9.3	97	83
II	25.0	2.0	13.3	10.0	10.0	13.3	28.4	53	70
III	18.4	8.4	27.0	17.0	20.0	10.0	10.0	30	76
IV	37.3	8.2	18.2	18.0	12.0	7.3	5.0	110	88
V	36.4	18.2	23.0	11.0	7.3	4.0	3.0	110	92
VI	32.0	....	26.4	11.0	16.0	11.0	5.3	19	84
VII	46.0	....	17.0	4.2	21.0	....	13.0	24	88
VIII	29.2	12.2	22.0	13.0	10.1	6.0	8.2	477	86
IX	25.0	4.2	17.0	13.0	25.0	8.4	8.4	24	77
X	24.0	1.4	19.1	13.0	14.0	15.0	16.0	147	75
XI	53.0	16.0	22.0	4.0	4.0	2.0	....	51	100
XII	42.0	0.0	25.0	9.0	9.0	5.0	2.0	101	91
XIII	19.0	19.0	24.4	16.4	19.0	....	3.0	37	86
XIV	13.4	13.4	20.0	27.0	13.4	13.4	....	15	80
XV	39.0	15.4	23.1	8.0	....	....	15.4	13	95
XVI	40.0	9.1	27.3	....	9.1	9.1	....	11	100
XVII	32.0	6.4	28.0	20.3	4.0	10.2	....	79	86
XVIII	43.3	11.0	23.0	14.0	6.0	3.0	1.4	74	94
XXI	35.0	10.4	21.0	10.4	17.3	....	7.0	29	89
Totals	30.9	10.3	22.0	12.5	10.3	6.8	7.3	1,501	86

TABLE XXXII. City distributions. Fourth grade. Addition. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	1.2	8.3	10.7	25.5	20.7	16.0	10.1	15.9	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	169	5.7
II	....	3.0	10.3	16.2	28.0	22.1	14.8	5.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	68	4.7
III	....	....	5.5	10.9	10.9	16.3	21.7	21.7	21.7	10.9	2.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	37	6.4
IV	....	.6	3.9	13.5	13.5	20.3	23.0	12.9	7.3	2.8	1.1	.6	.6	....	....	....	....	....	....	....	....	....	....	....	....	178	5.7
V	....	.6	2.3	5.8	16.2	16.2	19.7	11.6	13.9	8.1	2.3	1.7	1.2	....	....	....	....	.6	....	....	....	....	....	....	....	173	6.5
VI	....	....	7.2	14.3	7.2	21.5	28.6	....	21.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14	6.0
VII	....	3.2	3.2	18.8	12.5	15.7	21.9	12.5	9.4	....	....	....	3.2	....	....	....	....	....	....	....	....	....	....	....	....	32	5.8
VIII	.4	1.1	4.0	12.4	20.7	19.3	16.2	10.8	9.0	3.9	1.7	.1	1	....	....	....	1	....	....	....	....	....	....	....	....	623	5.6
IX	....	....	....	25.0	25.0	41.7	8.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	5.0
X	....	....	5.8	13.3	20.7	19.9	13.3	16.6	6.6	1.7	2.5	....	....	....	....	....	....	....	....	....	.9	....	....	....	....	121	5.4
XVII	....	....	....	2.2	5.4	14.0	14.0	16.2	15.1	10.8	8.6	5.4	1.1	2.2	3.2	....	....	2.2	....	....	....	....	....	....	....	93	7.9
XIX	....	....	2.9	....	25.8	28.8	20.	11.5	11.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	35	5.8
XX	....	1.1	5.6	7.8	14.5	12.6	22.2	14.8	9.3	6.3	2.6	1.9	.74	.40	....	....	.40	....	....	....	....	....	....	....	....	270	6.3
XXI	....	....	7.7	10.3	23.1	30.8	12.9	5.1	5.1	5.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	39	5.3
XXII	2.9	8.6	14.5	20.0	23.1	14.5	14.5	2.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	35	4.3
XXIV	....	1.3	5.0	12.5	21.9	22.5	18.8	11.3	5.6	....	....	1.3	....	....	....	....	....	....	....	....	....	....	....	....	....	160	5.4
Totals	.21	1.0	4.7	10.7	18.5	18.5	17.8	11.9	8.9	4.2	1.9	.84	.37	.16	.16	....	.11	.16	....	....	.05	....	....	....	....	1,899	5.9

TABLE XXXIII. City distributions. Fourth grade. Subtraction. Speed. May score, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	1.8	4.2	5.9	18.9	21.9	22.5	11.3	10.1	.6	3.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	169	6.0
II	1.5	10.2	17.4	13.1	21.8	17.4	10.2	5.8	1.5	1.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	69	4.4
III	....	....	....	10.9	5.5	8.2	21.7	13.6	21.7	10.9	5.5	2.8	....	....	....	....	....	....	....	....	....	....	....	....	....	37	7.4
IV	1.7	1.1	3.9	5.6	10.1	16.3	21.9	19.1	10.1	4.5	3.4	1.1	1.1	....	....	....	....	....	....	....	....	....	....	....	....	178	6.5
V	.6	1.7	1.2	6.4	10.4	10.4	8.7	9.3	11.6	12.1	9.8	6.4	2.9	1.7	1.2	2.9	.6	1.7	.6	....	....	....	....	....	....	173	8.2
VI	....	....	7.2	14.3	7.2	21.5	28.6	7.2	7.2	7.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14	6.0
VII	....	....	3.3	19.4	13.0	16.2	22.6	6.5	6.5	6.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	31	6.0
VIII	1.0	1.1	5.6	7.4	13.0	18.4	20.3	13.0	11.3	5.1	2.4	.6	.4	.3	....	....	....	.1	....	....	....	....	....	....	....	625	6.2
IX	....	8.4	33.4	25.0	33.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	3.3
X	.9	....	4.2	9.1	10.8	10.8	21.5	15.7	3.3	3.3	2.5	1.7	....	.9	....	....	....	....	....	....	....	....	....	....	....	121	6.7
XVII	....	....	1.1	4.3	5.4	14.0	17.3	6.5	21.6	8.6	7.5	3.2	2.5	....	2.5	5.4	....	....	....	....	....	....	....	....	....	93	3.1
XIX	....	3.0	3.0	3.0	14.9	20.6	20.5	14.9	11.8	3.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	34	6.2
XX	....	.4	1.5	5.9	11.5	14.5	19.6	15.9	17.0	5.2	4.1	1.1	1.1	1.1	.4	....	.4	.4	....	....	....	....	....	....	....	270	6.8
XXI	....	....	2.6	10.3	15.4	25.7	25.7	15.4	....	5.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	39	5.9
XXII	....	....	14.3	20.0	17.4	20.0	8.6	14.3	2.9	....	2.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	35	5.0
XXIV	....	.6	7.6	15.7	13.8	18.3	16.4	14.5	7.6	....	1.9	1.3	1.3	.6	....	....	....	....	.6	....	....	....	....	....	....	159	5.7
Totals	.64	1.3	4.5	7.5	12.6	16.3	19.0	12.9	11.9	5.2	3.7	1.4	.8	.42	.32	.53	.10	.26	.05	....	....	....	....	....	....	1,900	6.4

TABLE XXXIV. City distributions. Fourth grade. Multiplication. Speed. May score, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	.6	2.4	15.4	22.5	26.2	18.4	12.4	1.8	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	169	4.4
II	9.6	17.5	31.8	23.9	9.6	4.8	1.6	1.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	63	2.8
III	....	....	6.1	9.1	15.2	12.2	42.5	6.1	3.1	6.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	33	6.2
IV	.6	3.9	10.7	10.2	19.1	18.9	19.7	9.6	3.9	2.3	2.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	178	5.3
V	1.8	4.2	7.7	8.9	6.6	10.1	16.1	14.9	11.3	11.3	2.4	.6	2.4	.6	....	.6	....	.6	....	....	....	....	....	....	....	168	6.7
VI	....	14.3	28.6	28.6	14.3	7.2	....	....	7.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14	3.2
VII	....	13.8	3.5	20.7	31.1	10.4	13.8	3.5	3.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	29	4.4
VIII	.1	2.6	14.0	14.8	17.3	21.6	15.7	7.1	.3	1.1	.1	....	.1	....	.1	....	.1	.1	.1	....	....	....	....	....	....	624	5.0
IX	....	25.0	25.0	33.4	16.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	3.0
X	.9	.9	9.0	10.9	11.8	24.4	15.4	13.6	5.4	7.3	.9	.9	....	....	....	....	....	....	....	....	....	....	....	....	....	111	5.7
XVII	2.2	....	4.3	7.5	10.8	17.3	18.3	8.6	7.5	4.3	6.5	6.5	2.2	1.9	1.9	1.9	1.9	....	....	....	....	....	....	....	....	93	6.5
XIX	....	2.9	2.9	14.3	28.6	22.9	8.6	8.6	11.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	35	5.1
XX	....	1.2	2.3	9.6	13.0	23.4	26.8	12.7	6.5	2.3	1.2	.4	.8	....	....	....	....	....	....	....	....	....	....	....	....	261	6.0
XXI	....	5.1	18.0	18.0	18.0	18.0	15.4	5.1	....	2.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	39	4.6
XXII	14.3	17.2	44.3	14.3	2.9	5.8	5.8	2.9	....	....	2.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	35	2.6
XXIV	1.3	3.3	10.0	15.3	19.3	25.3	14.0	4.7	3.3	1.3	2.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	150	5.0
Totals	1.5	3.6	11.6	13.8	15.9	18.7	16.9	8.3	4.5	2.7	11.3	.48	.48	.16	.05	.16	.11	.11	.05	....	....	....	....	....	....	2,014	5.2

TABLE XXXV. City distributions. Fourth grade. Division. Speed. May score, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	2.9	14.7	28.8	28.2	16.5	4.1	3.5	.6	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	170	3.1
II	27.5	21.6	29.5	9.9	7.9	2.0	2.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	51	2.2
III	3.1	6.1	9.1	24.3	33.4	9.1	12.2	....	3.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	33	4.3
IV	3.4	12.3	12.9	20.2	30.7	11.2	8.9	4.5	2.2	1.7	1.7	....	.6	....	....	....	....	....	....	....	....	....	....	....	....	179	4.0
V	3.6	7.7	9.5	12.5	10.1	16.7	12.5	7.2	7.7	1.8	3.0	2.4	1.8	1.8	.6	....	....	.6	....	....	.6	....	....	....	....	168	5.4
VI	7.2	28.6	21.5	21.5	21.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14	2.6
VII	3.5	24.2	10.4	31.1	20.7	3.5	3.5	....	3.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	29	3.4
VIII	5.4	12.0	17.8	23.4	17.7	13.1	4.7	2.1	1.9	.4	.6	.1	.1	.1	.1	....	....	....	....	....	....	....	....	....	....	624	3.6
X	....	6.4	16.4	20.0	31.9	9.1	5.5	3.7	5.5	....	1.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	110	4.2
XVII	3.2	6.5	9.7	15.1	20.5	9.7	7.5	6.5	4.3	3.2	1.9	3.2	3.2	2.2	1.9	1.9	2.2	....	....	....	....	....	....	....	....	93	4.8
XIX	....	20.0	22.9	31.5	11.5	14.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	35	3.3
XX	....	3.0	13.5	15.7	14.2	22.3	14.2	4.5	10.5	.8	....	.8	.8	....	....	....	....	....	....	....	....	....	....	....	....	134	5.2
XXI	2.6	25.7	23.1	18.0	12.9	12.9	2.6	2.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	39	3.0
XXII	17.2	17.2	28.6	25.8	2.9	2.9	5.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	35	2.6
XXIV	2.7	5.3	15.3	22.7	26.7	7.3	6.0	8.0	3.3	....	.7	1.3	.7	....	....	....	....	....	....	....	....	....	....	....	....	150	4.2
Totals	4.3	11.5	17.6	20.8	17.8	12.0	6.2	2.9	3.2	.7	.8	.52	.52	.41	.17	.06	.12	.06	....	....	.06	....	....	....	....	1,714	3.8

TABLE XXXVI. City distributions. Fourth grade. Accuracy. May scores, 1915. Per cent of children making each score.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	7.1	....	8.9	7.7	7.7	14.8	53.9	169	47
II	13.3	....	6.0	7.4	10.3	14.8	48.6	68	51
III	....	....	8.2	10.9	21.7	19.0	40.6	37	56
IV	6.2	.6	11.3	9.0	16.9	12.9	43.3	178	55
V	17.9	1.2	13.3	8.1	10.4	11.0	38.2	173	61
VI	14.4	....	....	7.2	21.5	....	57.2	144	44
VII	12.5	3.4	9.4	....	12.5	21.9	40.7	32	54
VIII	11.7	.1	10.1	8.0	11.4	13.0	46.0	623	53
IX	....	....	....	8.4	8.4	....	83.0	412	30
X	2.5	.9	5.0	9.9	5.8	19.0	57.1	121	45
XVII	9.7	1.1	19.4	15.1	7.6	11.9	35.5	93	64
XIX	5.8	....	5.8	14.3	14.3	23.1	37.2	35	56
XX	2.6	....	4.5	8.9	9.6	12.6	61.9	270	40
XXI	12.9	....	20.6	2.6	12.9	15.4	36.1	39	60
XXII	8.6	....	2.9	....	5.8	8.6	74.0	35	35
XXIV	13.1	....	8.1	8.8	9.4	11.3	49.4	160	51
Totals	9.05	.4	9.42	8.5	11.0	13.5	48.7	1,899	51

SUBTRACTION.

	100	90	80	70	60	50	0–49	T.	M.
I	14.3	....	17.8	13.6	11.3	14.8	28.4	169	66
II	11.6	....	11.6	7.3	5.8	13.1	50.8	69	50
III	10.9	....	16.3	24.4	10.9	13.6	24.4	37	70
IV	11.3	.6	15.7	7.9	11.8	9.0	43.8	178	57
V	33.5	8.1	15.6	10.4	9.8	5.8	16.8	173	85
VI	21.5	....	14.4	....	21.5	21.5	21.5	14	63
VII	25.9	3.3	9.7	3.3	6.2	9.7	32.3	31	66
VIII	17.0	0.6	16.7	7.7	11.5	10.4	36.3	625	63
IX	8.4	....	....	....	8.4	16.7	66.7	12	38
X	12.4	.9	16.6	9.9	13.3	13.3	33.9	121	63
XVII	32.3	5.4	16.2	11.9	8.7	5.4	20.5	93	83
XIX	14.8	....	20.6	8.9	17.7	11.8	26.5	34	67
XX	7.4	1.1	13.3	10.8	15.9	11.1	40.4	270	59
XXI	20.6	....	23.2	15.4	10.4	10.4	20.6	39	77
XXII	11.5	....	14.3	2.9	8.6	5.8	57.4	35	45
XXIV	14.5	....	11.3	5.0	12.0	10.7	46.6	159	54
Totals	16.4	1.5	15.7	9.4	11.8	10.4	34.2	1,900	64

TABLE XXXVII. City distributions. Fourth grade. Accuracy. May scores, 1915. Per cent of children making each score.

MULTIPLICATION.

	100	90	80	70	60	50	0–49	T.	M.
I	14.8	....	8.9	9.5	11.8	16.0	39.1	169	57
II	9.6	....	1.6	1.6	9.6	8.0	69.9	63	36
III	15.2	....	18.2	6.1	6.1	15.2	39.4	33	58
IV	13.5	.6	12.9	8.4	14.1	14.1	36.5	178	57
V	31.0	1.2	19.1	8.9	12.5	8.9	18.5	168	81
VI	7.2	....	7.2	....	14.4	....	71.5	14	35
VII	17.3	....	6.9	6.9	10.4	13.8	44.9	29	55
VIII	16.5	.1	11.1	7.9	10.9	10.3	43.0	624	57
IX	8.4	....	....	8.4	16.7	....	66.7	12	38
X	19.9	....	15.4	5.4	7.2	12.7	39.7	111	59
XVII	21.6	3.2	19.4	10.8	10.8	9.7	24.8	93	77
XIX	5.8	....	11.5	8.6	20.0	20.0	34.3	35	57
XX	7.3	....	10.7	7.7	15.0	13.4	46.0	261	53
XXI	25.7	....	12.9	7.7	15.4	7.7	30.8	39	69
XII	8.6	2.9	2.9	2.9	....	8.6	74.3	35	35
XXIV	19.0	....	15.3	5.3	10.0	10.7	40.7	150	59
Totals	16.1	4.8	11.8	7.7	11.9	11.6	40.6	2,014	58

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	19.4	....	1.8	4.7	10.6	19.4	44.1	170	53
II	9.9	....	....	2.0	....	7.9	80.4	51	31
III	12.2	....	9.1	12.2	3.1	15.2	48.5	33	50
IV	22.4	.6	6.7	6.7	9.5	12.3	41.9	179	56
V	42.3	2.4	11.9	6.0	10.2	8.9	18.5	166	85
VI	21.5	....	....	14.4	14.4	14.4	35.8	14	60
VII	34.5	....	6.9	3.5	6.9	....	48.3	29	65
VIII	22.9	.1	6.1	4.5	9.0	7.4	50.0	624	50
IX	....	....	....	....	....	....	....	....	....
X	39.1	....	3.7	11.9	6.4	10.0	39.1	110	61
XVII	31.2	3.2	8.7	8.7	7.6	11.9	29.1	93	73
XIX	20.0	....	....	5.8	11.5	14.3	48.6	35	52
XX	15.7	....	14.2	6.7	12.0	15.7	35.8	134	59
XXI	53.9	....	....	5.2	5.2	5.2	30.8	39	100
XXII	11.5	....	5.8	2.9	2.9	14.3	63.1	35	41
XXIV	21.3	....	3.3	6.0	7.3	10.7	51.3	150	49
Totals	24.7	5.3	6.4	5.9	8.7	10.7	43.2	1,714	56

TABLE XXXVIII. City distributions. Fifth grade. Addition. Speed. May scores, 1915. Per cent of children making each score.

,	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	.9	.9	1.2	4.3	7.9	18.2	24.9	17.0	9.1	9.7	3.0	3.6	....	....	....	....	....	....	....	....	....	....	....	....	....	165	6.7
II	....	....	3.8	3.8	13.0	27.8	22.3	16.7	7.5	5.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	54	6.0
III	....	....	....	6.3	18.8	12.5	21.9	15.7	12.5	6.3	6.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32	6.5
IV	.7	....	....	.7	4.6	9.2	16.5	15.1	19.8	15.8	7.3	3.3	4.6	.7	....	.7	.7	.7	....	....	....	....	....	....	....	152	8.2
V	....	....	....	3.3	7.7	8.7	19.7	15.3	20.8	8.2	5.5	5.5	1.6	1.6	1.6	....	.6	....	....	....	....	....	....	....	....	183	7.7
VI	....	....	....	15.8	36.9	5.3	26.4	5.3	....	10.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19	5.0
VII	....	....	....	....	9.1	39.2	17.4	17.4	9.1	....	....	9.1	....	....	....	....	....	....	....	....	....	....	....	....	....	23	6.3
VIII	.1	.1	2.0	8.2	9.0	13.3	22.3	17.7	13.9	10.7	4.7	2.0	1.6	....	.3	.1	.1	....	....	....	.1	....	....	....	....	654	7.0
IX	....	....	8.4	25.0	33.4	16.7	8.4	8.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	4.5
X	.8	.8	4.9	4.1	14.5	17.8	19.4	13.7	19.4	4.1	.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	124	6.3
XVII	....	....	....	....	3.3	10.9	7.7	13.1	16.4	10.9	10.9	8.7	6.6	5.5	3.3	....	1.1	....	....	....	1.1	1.1	....	....	....	92	8.9
XIX	....	....	2.5	12.4	12.4	19.6	26.9	14.7	9.9	2.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	41	6.2
XX	....	....	.5	2.3	5.9	15.4	19.5	22.2	18.1	10.4	1.8	2.7	1.1	.5	....	....	....	....	....	....	....	....	....	....	....	221	7.3
XXI	2.8	....	....	....	....	5.6	25.0	11.2	22.3	11.2	8.4	5.6	5.6	....	2.8	....	....	....	....	....	....	....	....	....	....	36	8.5
XXII	....	....	....	2.6	10.3	25.7	23.1	15.4	7.7	10.3	5.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	37	6.6
XXIII	....	....	....	4.7	7.7	17.0	17.0	17.0	21.6	10.8	1.6	1.6	1.6	....	....	....	....	....	....	....	....	....	....	....	....	65	7.3
XXIV	....	.5	4.3	4.3	14.0	16.7	26.9	17.7	11.3	2.7	.5	.5	....	.5	....	....	....	....	....	....	....	....	....	....	....	186	6.5
Totals	.2	.2	1.6	3.4	9.2	14.6	21.1	16.4	14.9	19.1	3.8	2.5	1.4	.5	.4	.1	.2	.05	....	....	.1	.05	....	....	....	2,096	7.0
Indiana totals	.04	.35	2.07	5.15	13.8	16.5	21.6	16.9	13.8	5.4	3.7	1.56	.78	.35	.43	.08	.08	.04	.04	....	....	....	....	....	....	2,624	6.6

TABLE XXXIX. City distributions. Fifth grade. Subtraction. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I			2.4	4.3	7.9	14.6	19.4	22.4	15.2	7.3	3.6	1.8	.9		.9											165	7.1
II			5.7	7.6	13.3	15.1	22.7	15.1	9.5	3.8	5.7	1.9														53	6.4
III				3.1	6.1	9.1	9.1	24.4	12.2	18.2	15.2			3.1												33	8.0
IV				2.0	3.3	1.3	11.3	15.2	17.9	14.6	13.9	7.3	5.3	5.3			1.3		.7							151	9.0
V			.6	.6	2.2	4.9	13.2	14.3	23.1	14.3	9.3	10.4	2.2	3.3	2.2				.6							182	8.6
VI			5.3	5.3	21.1	21.1	5.3	26.4	5.3	10.6																19	6.0
VII			4.4	9.1	9.1	21.8	21.8	9.1	13.1	4.4	4.4		4.4													23	6.4
VIII	.4	.3	1.8	2.9	5.5	9.6	18.4	15.6	17.3	10.7	7.4	4.9	2.3	.8	1.2	.1	.1	.1	.1						.1	654	7.7
IX			8.4	8.4	41.7	16.7	8.4	8.4	8.4																	12	4.8
X			3.3	4.1	9.7	16.2	21.8	17.8	12.9	6.5	4.9	.8	.8	1.6												124	6.9
XVII				2.2	2.2	6.6	9.8	9.8	17.4	7.7	15.3	7.7	7.7	3.3	6.6		2.2	1.1			1.1					92	9.3
XIX			4.9	7.4	9.9	12.4	25.0	17.1	9.9	9.9	2.5	2.5														41	6.7
XX				.5	2.3	6.3	13.6	14.5	27.1	16.3	10.9	3.6	3.2	.9		.5		.5								221	8.5
XXI					2.8	8.4	11.2	19.5	13.9	8.4	25.0	8.4														36	8.6
XXII			2.8		19.5	16.7	16.7	33.4	8.4		5.3			2.8												36	6.9
XXIII				1.6		3.1	7.7	17.0	21.6	20.0	12.4	12.4	4.7													65	9.0
XXIV			3.2	4.8	9.1	14.4	20.4	12.3	13.4	7.0	1.1	1.1	1.6		.5	.5			.5			.5	.5			187	6.6
Totals	.1	.1	1.3	2.7	5.3	9.1	15.7	16.9	17.6	11.5	8.6	4.7	2.6	1.6	.9	.2	.3	.1	.2		.5	.5	.05		.05	2,096	7.9
Indiana totals	.08	.08	1.07	2.21	6.8	10.7	23.0	18.1	17.4	9.78	6.08	2.68	1.49	.53	.3	.15	.04		.04							2,622	7.8

TABLE XL. City distributions. Fifth grade. Multiplication. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	1.2	2.4	4.3	13.4	25.0	26.2	14.0	7.3	3.7	1.8	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	164	6.1
II	....	5.6	9.3	20.4	5.6	9.3	31.5	9.3	....	7.5	....	1.9	....	....	....	....	....	....	....	....	....	....	....	....	....	54	6.0
III	....	....	....	....	3.2	18.8	34.4	25.0	9.4	3.2	6.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32	6.8
IV	....	.7	4.0	6.1	5.4	9.4	18.1	21.0	11.0	10.1	7.0	5.0	1.4	....	.7	1.4	....	....	....	....	....	....	....	....	....	149	7.3
V	....	....	.6	1.1	3.9	11.2	15.7	18.0	10.7	20.8	9.0	4.5	1.1	2.3	....	1.1	....	....	....	....	....	....	....	....	....	178	8.0
VI	....	....	10.0	....	5.0	35.0	10.0	10.0	20.0	5.0	....	....	....	....	....	5.0	....	....	....	....	....	....	....	....	....	20	6.0
VII	....	....	....	14.3	9.6	4.8	14.3	19.1	28.6	4.8	4.8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	21	7.5
VIII	.1	.1	3.2	6.6	10.4	17.2	20.1	19.3	8.9	5.5	4.2	2.0	.1	.1	.1	....	....	....	....	....	....	.1	....	....	....	652	6.5
IX	8.4	16.7	50.0	16.7	....	8.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	2.5
X	....	.8	3.9	10.9	9.3	20.2	24.1	16.3	7.0	3.9	1.6	.8	.8	.8	....	....	....	....	....	....	....	....	....	....	....	129	6.2
XVII	....	....	4.4	1.1	5.5	3.3	14.4	9.8	15.3	13.1	16.4	6.6	4.4	2.2	1.1	1.1	....	1.1	1.1	....	....	....	....	....	....	92	8.8
XIX	....	....	....	7.5	17.5	15.0	12.5	15.0	7.5	15.0	2.5	5.0	2.5	....	....	....	....	....	....	....	....	....	....	....	....	40	6.8
XX	....	.5	1.3	1.3	6.3	12.6	25.2	21.2	20.3	4.9	4.9	1.0	.5	....	....	....	....	....	....	....	....	....	....	....	....	222	7.1
XXI	....	2.8	2.8	2.8	8.4	22.3	13.9	22.3	8.4	11.2	2.8	....	....	....	....	....	2.8	....	....	....	....	....	....	....	....	36	6.8
XXII	....	....	12.9	10.3	18.0	33.4	15.4	2.6	2.6	2.6	2.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	39	5.3
XXIII	....	....	1.6	6.3	14.1	25.0	17.2	18.8	7.9	6.3	3.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	64	6.2
XXIV	.6	1.7	3.4	7.8	9.5	17.3	17.9	11.2	11.7	4.5	4.5	3.9	3.4	1.7	....	....	.6	....	....	.6	....	....	....	....	....	179	6.6
Totals	.1	.9	2.6	4.6	7.8	14.2	19.2	17.2	13.6	8.6	5.2	3.0	1.4	.6	.2	.3	.1	.05	.05	.05	....	.05	....	....	....	2,083	7.0
Indiana totals	.42	1.18	3.19	9.32	10.92	17.68	21.11	15.86	9.44	4.56	3.42	1.6	.94	.31	.076	.12	....	....	....	....	....	....	....	....	....	2,630	6.3

TABLE XLI. City distributions. Fifth grade. Division. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	6.1	13.4	24.4	22.6	17.7	9.2	4.9	1.2	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	164	4.3
II	3.8	7.5	9.3	16.7	18.6	13.0	14.9	1.9	5.6	5.6	....	....	1.9	1.9	....	....	....	....	....	....	....	....	....	....	....	54	4.7
III	....	....	12.2	18.2	12.2	36.3	18.2	9.4	3.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	33	5.3
IV	....	3.3	6.7	10.1	17.5	12.1	12.1	8.7	8.1	6.1	7.4	2.1	4.0	1.4	.7	....	....	....	....	....	....	....	....	....	....	149	6.0
V	....	.6	3.4	5.7	18.3	12.0	13.7	9.1	14.3	10.3	4.0	4.0	3.4	1.1	....	....	....	....	....	....	....	....	....	....	....	175	6.8
VI	5.6	....	16.7	27.8	33.4	16.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	18	4.0
VII	9.6	....	23.9	19.1	19.1	19.1	....	....	....	....	....	4.8	4.8	....	....	....	....	....	....	....	....	....	....	....	....	21	4.0
VIII	2.0	6.6	9.5	18.0	22.0	15.2	9.2	4.6	6.2	2.3	1.5	1.4	.1	.1	....	.1	....	....	....	....	.1	....	....	....	....	651	4.6
IX	16.7	33.4	33.4	8.4	8.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	2.0
X	....	6.2	10.8	26.2	20.8	17.7	8.5	2.3	4.6	1.6	1.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	130	4.3
XVII	1.1	2.2	3.3	7.7	8.7	9.8	13.1	8.7	10.9	6.6	10.9	2.2	6.6	3.3	2.2	1.1	1.1	....	....	....	....	....	1.1	....	....	92	7.5
XIX	....	5.0	22.5	42.5	12.5	5.0	7.5	2.5	....	....	....	2.5	....	....	....	....	....	....	....	....	....	....	....	....	....	40	3.5
XX	....	.9	6.9	9.1	21.5	20.5	19.6	6.9	7.3	3.7	1.8	1.4	.5	....	....	....	....	....	....	....	....	....	....	....	....	219	5.6
XXI	....	2.8	5.6	11.2	30.6	16.7	16.7	....	5.6	8.4	....	....	....	2.8	....	....	....	....	....	....	....	....	....	....	....	36	5.0
XXII	....	5.2	20.6	33.4	23.1	10.3	5.2	....	2.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	39	3.7
XXIII	....	....	3.2	14.3	41.3	17.5	8.0	6.4	4.8	3.2	....	....	....	1.6	....	....	....	....	....	....	....	....	....	....	....	63	4.8
XXIV	....	4.5	8.9	17.9	17.9	15.6	12.9	6.2	6.7	2.8	2.2	3.4	1.1	....	....	....	....	....	....	....	....	....	....	....	....	179	5.1
Totals	1.0	4.4	9.2	16.5	20.7	15.3	11.4	5.5	6.4	3.5	2.3	1.6	1.4	.6	.1	.1	.05	....	....	....	.05	....	.05	....	....	2,075	4.9
Indiana totals	2.10	5.21	11.3	21.0	21.4	9.45	7.7	8.6	5.83	2.7	2.28	.81	6.42	.22	.19	.19	.04	.04	....	....	....	....	....	....	....	2,617	4.5

TABLE XLII. City distributions. Fifth grade. Accuracy. May scores, 1915. Per cent of children making each score.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	4.9	.6	13.3	7.3	14.6	14.6	44.9	165	55
II	11.2	....	14.9	11.2	14.9	13.0	35.2	54	61
III	25.0	....	9.4	6.3	15.7	21.9	21.9	32	64
IV	11.9	2.0	10.5	17.8	15.1	15.1	30.3	152	63
V	15.9	3.3	20.8	14.8	13.7	8.2	23.5	183	73
VI	26.4	....	....	15.8	5.3	15.8	36.9	19	60
VII	4.4	....	26.1	4.4	17.4	8.7	39.2	23	63
VIII	10.4	1.1	14.7	9.8	14.8	17.3	32.0	654	61
IX	....	....	....	16.7	16.7	16.7	50.0	12	50
X	10.5	....	11.3	11.3	13.7	13.7	39.5	124	58
XVII	15.3	5.5	27.2	14.2	6.6	9.8	22.0	92	78
XIX	9.8	....	9.8	7.4	26.2	14.7	31.8	41	61
XX	6.3	....	10.4	7.7	11.8	11.8	52.0	221	48
XXI	8.4	5.6	....	16.7	19.5	19.5	30.6	36	60
XXII	10.3	....	30.8	12.9	12.9	15.4	18.0	39	74
XXIII	1.6	....	7.7	4.7	9.3	12.4	64.7	65	39
XXIV	18.8	....	28.1	6.5	11.3	10.8	29.6	186	69
Totals	10.7	1.1	15.1	10.4	13.8	14.1	35.0	2,096	61

SUBTRACTION.

	100	90	80	70	60	50	0–49	T.	M.
I	20.0	.6	21.8	16.4	9.1	12.7	19.4	165	76
II	24.6	....	15.1	7.6	17.0	13.3	22.7	53	67
III	12.2	9.1	30.4	12.2	6.1	15.2	15.2	33	81
IV	14.6	5.3	24.5	13.2	11.9	7.3	17.2	151	77
V	41.8	4.9	21.4	9.3	9.3	7.7	5.5	182	88
VI	15.8	....	42.2	5.3	10.6	10.6	15.8	19	83
VII	4.4	4.4	26.1	8.7	8.7	13.1	34.8	23	65
VIII	21.4	2.6	21.2	11.2	13.9	11.6	18.1	654	76
IX	16.7	....	8.4	16.7	8.4	25.0	25.0	12	60
X	8.1	.8	21.0	15.4	13.7	14.5	26.4	124	66
XVII	27.2	12.0	26.1	8.7	9.8	6.6	9.8	92	86
XIX	34.2	2.5	17.1	7.4	14.7	4.9	19.6	41	83
XX	13.2	1.4	14.9	17.7	16.3	14.5	22.2	221	68
XXI	16.7	8.4	25.0	8.4	13.9	19.5	8.4	36	80
XXII	13.2	....	29.0	13.2	15.8	18.5	10.6	38	74
XXIII	3.1	6.2	7.7	6.2	10.8	12.4	54.0	65	47
XXIV	18.2	1.1	16.0	11.2	10.7	12.8	29.9	187	67
Totals	20.0	3.0	2.5	12.5	12.6	11.8	19.8	2,096	75

TABLE XLIII. City distributions. Fifth grade. Accuracy. May scores, 1915. Per cent of children making each score.

MULTIPLICATION.

	100	90	80	70	60	50	0–49	T.	M.
I	15 9		11 0	9 8	**23 8**	13 4	26 2	184	64
II	13 0	1 9	5 6	9 3	14 9	**14 9**	40 8	54	56
III	15 7	3 2	15 7	12 5	**12 5**	21 9	18 8	32	68
IV	12 8	1 4	25 5	**14 1**	8 1	14 8	23 5	149	73
V	30 3	1 0	**24 7**	15 2	7 9	7 3	10 8	178	84
VI	15 0		20 0	10 0	**5 0**	15 0	35 0	20	60
VII	4 8	4 8	23 9	9 6	**14 3**	9 6	3 4	21	67
VIII	16 7	1 4	18 6	12 0	**13 7**	13 0	24 7	652	69
IX	25 0			8 4	**16 7**	50 0		12	50
X	17 1	1 6	16 3	7 0	**15 5**	12 4	30 3	129	65
XVII	29 4	4 4	**17 4**	13 1	13 1	12 0	10 9	92	81
XIX	5 1	2 5	25 0	7 5	**17 5**	15 0	27 5	40	64
XX	10 4	0 5	15 3	11 3	**17 6**	16 7	28 4	222	63
XXI	19 6	2 8	8 4	5 6	**16 7**	19 5	27 8	36	62
XXII	10 3		15 4	10 3	**15 4**	15 4	33 4	39	62
XXIII	3 2		6 3	7 9	6 3	12 5	**64 1**	64	39
XXIV	32 4	1 1	**20 1**	8 9	10 6	9 5	17 3	179	82
Totals	17 9	1 5	17 7	11 1	**13 6**	13 1	25 2	2,083	69

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	22 6		9 8	10 4	**15 9**	11 0	30 4	164	65
II	26 0		18 6	**11 2**	5 6	7 5	31 5	54	75
III	27 3		**21 3**	12 2	12 2	6 1	21 3	33	80
IV	28 9	7 4	12 1	**4 7**	12 8	14 1	20 2	149	79
V	41 7	1 7	**17 7**	10 3	8 0	9 7	10 9	175	86
VI	11 2		5 6	11 2	16 7	**11 2**	44 5	18	55
VII	23 9	9 6	4 8	4 8	**23 9**	33 4		21	68
VIII	24 0	1 2	12 9	8 1	**9 5**	9 3	35 0	651	66
IX	16 7					16 7	**66 7**	12	38
X	25 4		9 3	3 1	6 9	**14 6**	40 8	130	56
XVII	32 7	5 5	9 8	**17 4**	8 0	6 6	20 7	92	79
XIX	27 5		5 2	7 5	7 5	**12 5**	40 0	40	58
XX	19 2	9	14 6	7 3	**13 2**	14 6	30 1	219	64
XXI	22 3		13 9	11 2	**11 2**	13 9	27 8	36	68
XXII	15 4		5 2	15 4	7 7	2 6	**53 9**	39	48
XXIII	3 2		8 0	8 0	8 0	17 5	**55 0**	63	47
XXIV	27 9	1 7	10 6	8 9	**11 7**	12 5	26 8	179	69
Totals	25 3	1 7	12 3	8 6	**10 5**	11 3	30 7	2,075	68

TABLE XLIV. City distributions. Sixth grade. Addition. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I				1.5	9.8	8.3	16.6	20.3	25.6	11.3	3.0	2.3	.8						.8							133	7.7
II			3.6	19.7	21.5	17.9	23.3	7.2		3.6		3.6														56	5.3
III					9.6	23.9	19.1	4.8	9.6	23.9	9.6															21	7.0
IV				1.6	3.9	4.7	10.1	15.5	15.5	17.1	14.8	6.2	5.5	2.4	1.6		.8		.8							129	9.0
V					2.4	6.6	12.7	14.5	15.1	13.3	10.3	10.3	6.0	2.4	1.8	2.4	.6		1.2						.6	166	8.9
VI				3.8	7.5	22.3	29.7	11.2	11.2	3.8	7.5				3.8											27	6.8
VII					3.0	14.8	14.8	5.9	23.6	14.8	3.0	5.9	11.8	3.0												38	8.5
VIII			.6	1.6	3.7	8.3	20.9	15.3	21.3	10.5	8.6	4.1	1.6	.9	.9	.3	.8		.3		.1					655	8.0
IX			7.7	15.4	23.1	38.5	15.4																			13	5.0
X			2.1	4.8	8.2	15.7	20.4	20.4	9.5	9.5	3.4	2.1	2.7	.7	.7											147	7.0
XVII					2.3	5.7	10.2	4.5	10.2	13.5	15.8	5.7	7.9	5.7	9.1	5.7	2.3	1.2	1.2							89	10.3
XIX			3.4	3.4	3.4	10.0	30.0	12.4	10.0	13.4	10.0	3.4														30	7.0
XX			.5	.5		3.6	8.8	9.8	12.4	20.2	27.1	11.9	5.7	4.7	3.1	1.0		.5								193	9.6
XXI				14.7	4.9	22.0	14.7	19.6	7.4	7.4	7.4	2.5														41	6.7
XXII			6.6	8.7	2.2	28.4	10.9	26.1	13.1	4.4																46	6.4
XXIII			1.5		7.2	11.5	8.6	21.5	11.5	11.5	8.6	5.8	7.2	1.5	2.9		1.5									70	8.0
XXIV			1.2	3.1	9.8	12.8	16.5	18.9	20.7	7.9	4.9	1.8	1.2	1.2												164	7.4
Totals			.75	2.2	5.5	9.5	16.1	15.0	17.6	12.2	8.4	5.0	3.5	1.4	.99	.65	.65	.05	.35	.10	.05		.05		.05	2,016	8.1
Indiana totals		.039	1.11	3.2	7.12	11.5	19.4	17.4	15.1	10.3	6.52	3.84	2.4	1.0	.5	.4	.2	.1	.039	.039		.039				2,530	7.4

TABLE XLV. City distributions. Sixth grade. Subtraction. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	....	.8	.8	7.5	13.6	21.1	21.8	15.8	10.6	5.2	....	2.3	....	.8	....	....	....	....	....	....	....	....	133	9.3
II	....	....	1.8	....	9.0	12.5	16.1	19.7	19.7	14.3	1.8	3.6	1.8	....	....	....	....	....	....	....	....	....	....	....	....	56	7.6
III	....	....	....	9.1	9.1	9.1	18.2	27.3	13.7	13.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	22	7.0
IV	....	....	....	....	.8	2.4	4.7	10.1	17.9	10.1	17.1	12.4	6.2	8.6	3.1	3.1	.8	.8	2.4	....	....	....	....	....	....	129	10.3
V	....	....	....	.6	....	1.2	1.8	7.8	12.7	14.5	16.9	11.5	9.6	7.8	3.6	3.0	2.4	3.6	1.8	.6	....	....	....	....	.6	166	10.7
VI	....	....	....	....	3.6	7.2	14.3	25.0	28.6	7.2	7.2	3.6	3.6	....	....	....	....	....	....	....	....	....	....	....	....	28	8.0
VII	....	....	....	....	....	....	14.8	8.9	29.5	14.8	5.9	8.9	8.9	....	5.9	3.0	....	....	....	....	....	....	....	....	....	34	8.9
VIII	....	....	....	.5	1.4	4.1	12.1	12.7	18.5	13.6	13.8	8.7	4.4	3.8	2.2	.6	1.8	.6	.7	....	.3	....	.1	....	....	654	9.1
IX	....	....	15.4	7.7	23.1	38.5	....	7.7	7.7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13	5.2
X	....	....	2.1	2.1	2.7	6.8	10.8	18.3	21.6	8.8	11.5	6.1	6.8	2.1	....	.7	....	....	....	....	....	....	....	....	....	148	8.3
XVII	....	....	....	....	....	3.4	6.8	4.5	11.3	5.7	12.4	7.9	9.0	10.2	5.7	9.0	3.4	3.4	1.2	3.4	....	2.3	1.2	....	....	89	11.9
XIX	....	....	....	....	3.1	6.1	9.1	18.2	33.4	12.2	3.1	9.1	3.1	3.1	....	....	....	....	....	....	....	....	....	....	....	33	8.5
XX	....	....	....	....	....	.5	3.7	5.2	14.7	17.8	16.2	13.1	13.6	13.6	9.4	1.6	2.1	1.0	1.0	....	....	....	....	....	....	191	10.5
XXI	....	....	2.5	4.9	9.8	9.8	7.4	9.8	24.4	12.2	9.8	2.5	4.9	....	....	2.5	....	....	....	....	....	....	....	....	....	41	8.3
XXII	....	....	4.4	4.4	4.4	21.8	10.9	30.5	10.9	8.7	4.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	46	7.1
XXIII	....	....	1.5	1.5	8.5	....	9.9	8.5	17.0	9.9	9.9	9.9	11.3	5.7	1.5	1.5	2.9	1.5	....	....	....	....	....	....	....	71	9.3
XXIV	....	.6	.6	....	3.6	11.5	12.7	18.2	30.0	10.3	6.7	5.5	3.6	1.8	1.2	1.2	.6	.6	.6	....	.6	....	....	....	....	165	8.2
Totals	....	.06	.56	.66	2.1	4.8	9.2	12.6	18.3	13.1	12.6	8.6	6.3	4.3	2.0	1.5	1.3	.9	.66	.20	.15	.10	.10	....	.06	2,019	9.1
Indiana totals	.079	.079	.198	.79	2.45	4.59	13.29	12.05	18.82	18.01	11.69	7.43	4.96	2.53	1.541	.553	.632	.316	.198	.079	.079	....	....	....	....	2,527	8.9

TABLE XLVI. City distributions. Sixth grade. Multiplication. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	2.3	3.1	8.4	13.0	26.0	15.3	15.3	11.5	1.6	2.3	....	....	....	....	....	....	....	....	....	.8	....	....	131	7.9
II	....	....	3.7	3.7	12.8	25.5	11.0	23.7	5.5	7.3	....	1.9	1.9	1.9	....	....	....	1.9	....	....	....	....	....	....	....	55	6.5
III	....	....	4.8	....	....	19.1	4.8	28.6	23.9	14.3	....	....	4.8	....	....	....	....	....	....	....	....	....	....	....	....	21	7.8
IV	....	....	....	....	1.6	5.7	11.3	17.0	8.9	20.2	15.4	6.5	5.7	4.1	2.4	.8	.8	....	....	....	....	....	....	....	....	124	9.3
V	....	....	....	.7	1.3	2.6	10.9	6.4	10.3	10.9	11.6	13.5	7.1	9.6	1.9	5.8	1.9	1.3	1.3	.7	1.3	1.3	....	....	....	156	10.6
VI	....	....	7.5	....	7.5	18.6	22.3	26.0	11.2	3.8	....	3.8	....	....	....	....	....	....	....	....	....	....	....	....	....	27	6.8
VII	....	....	....	....	....	5.9	5.9	26.5	20.6	14.8	5.9	17.7	....	....	....	....	....	....	....	3.0	....	....	....	....	....	34	8.6
VIII	.1	.1	.6	2.1	5.1	11.3	17.0	16.1	15.0	11.2	6.9	5.3	2.6	1.8	.9	.7	.1	....	.1	.1	....	....	....	....	.1	652	7.8
IX	....	....	30.8	30.8	15.4	7.7	15.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13	3.7
X	....	....	1.9	4.5	5.8	15.4	25.7	12.2	7.7	9.6	5.8	5.2	3.9	1.9	.7	....	....	....	....	....	....	....	....	....	....	156	6.9
XVII	....	....	....	....	2.3	5.7	10.2	4.5	10.2	13.5	15.8	5.7	7.9	5.7	9.1	5.7	2.3	1.2	1.2	....	....	....	....	....	....	89	10.3
XIX	....	....	3.4	3.4	3.4	10.0	30.0	13.4	10.0	13.4	10.0	3.4	....	....	....	....	....	....	....	....	....	....	....	....	....	31	7.0
XX	....	....	.5	.5	....	3.6	8.8	9.8	12.4	20.2	27.1	11.9	5.7	4.7	3.1	1.0	....	.5	....	....	....	....	....	....	....	193	9.6
XXI	....	....	....	14.7	4.9	22.0	14.7	19.6	7.4	7.4	7.4	2.5	....	....	....	....	....	....	....	....	....	....	....	....	....	41	6.7
XXII	....	....	6.6	8.7	2.2	28.4	10.9	26.1	13.1	4.4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	46	6.4
XXIII	....	....	1.5	....	7.2	11.5	8.6	21.5	11.5	11.5	8.6	5.8	7.2	1.5	2.9	....	1.5	....	....	....	.6	....	....	....	....	70	8.0
XXIV	....	.6	.6	3.0	4.8	14.9	17.9	15.5	13.1	10.1	7.7	3.0	3.0	1.2	1.8	1.2	....	.6	....	.6	.6	....	....	....	....	169	7.6
Totals	.05	.10	1.1	2.8	3.9	10.7	14.9	15.5	12.4	12.3	9.6	6.0	3.6	2.6	1.5	1.1	.45	.35	.20	.25	.15	.10	.05	....	.05	2,008	8.1
Indiana totals	.16	.39	1.27	3.25	5.62	11.76	17.98	17.11	12.32	9.98	8.87	6.26	2.26	1.31	.63	5.15	.16	.08	....	....	....	....	....	....	....	2,526	7.6

TABLE XLVII. City distributions. Sixth grade. Division. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	.8	1.6	6.2	7.7	13.0	22.3	11.5	9.9	9.9	9.9	1.6	3.1	2.3	.8	....	....	....	....	....	....	....	....	....	....	131	6.9
II	....	1.9	1.9	9.1	31.0	12.8	18.2	9.1	9.1	3.7	....	....	1.9	1.9	....	....	....	....	....	....	....	....	....	....	....	55	5.6
III	....	....	4.8	33.4	14.3	19.1	14.3	14.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	21	5.0
IV	....	....	....	4.1	6.5	8.9	13.7	16.2	13.7	10.5	7.3	3.3	9.7	6.5	....	....	....	....	....	....	....	....	....	....	....	124	8.1
V	.7	....	....	3.2	7.1	8.3	9.6	13.5	12.8	9.6	10.3	3.9	3.9	5.8	3.9	2.6	1.9	.7	1.3	....	....	.7	....	.7	....	156	8.6
VI	....	3.6	....	25.0	25.0	14.3	7.2	7.2	10.8	7.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	28	4.8
VII	....	....	3.0	....	8.9	11.8	20.6	5.9	23.6	8.9	....	....	14.8	3.0	....	....	....	....	....	....	....	....	....	....	....	34	8.0
VIII	.4	1.4	2.2	10.6	16.0	13.8	17.6	8.9	11.1	6.3	3.2	2.6	2.8	.9	.4	.4	.1	.1	.1	....	.1	.1	....	....	....	651	6.3
IX	....	23.1	23.1	30.8	23.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13	3.2
X	....	2.6	5.8	10.9	16.0	12.2	11.6	13.5	8.3	3.2	.7	4.5	5.8	1.3	1.3	1.3	1.3	....	....	....	....	....	....	....	....	156	6.2
XVII	....	....	1.2	3.4	7.9	10.2	7.9	9.1	10.2	10.2	7.9	4.5	5.7	6.8	3.4	5.7	2.3	....	3.4	....	1.2	....	....	....	....	89	9.1
XIX	....	....	3.4	10.0	20.0	16.7	20.0	10.0	13.4	....	3.4	....	....	3.4	....	....	....	....	....	....	....	....	....	....	....	30	6.0
XX	....	....	1.1	4.4	8.7	18.0	9.8	9.3	15.3	10.4	8.2	4.4	6.6	1.6	1.6	.06	....	....	....	....	....	....	....	....	....	183	7.9
XXI	....	7.4	2.5	7.4	9.8	19.6	17.1	12.4	9.8	2.5	4.9	2.5	2.5	....	....	....	2.5	....	....	....	....	....	....	....	....	41	6.3
XXII	....	2.2	15.3	32.7	24.0	13.1	6.6	4.4	2.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	46	4.0
XXIII	1.5	....	5.8	12.9	25.8	15.8	11.5	5.8	5.8	1.5	2.9	....	....	....	1.5	....	....	....	....	....	....	....	....	....	....	70	4.8
XXIV	....	.6	3.6	9.5	13.1	23.8	17.3	7.2	8.9	6.6	2.4	2.4	1.2	....	1.2	.6	1.2	....	....	....	....	.6	....	....	....	168	5.9
Totals	2.5	1.2	2.6	9.2	14.2	14.1	14.8	9.9	10.9	6.7	4.5	2.6	3.7	2.0	1.0	.9	.6	.10	.3	....	.10	.15	....	.05	....	1,996	6.5
Indiana totals	.56	1.91	3.89	11.47	17.22	10.8	8.37	13.57	10.24	6.11	5.59	3.38	2.98	1.75	.8	.78	.52	.14	.12	.08	....	....	....	....	....	2,521	5.7

TABLE XLVIII. City distributions. Sixth grade. Accuracy. May scores, 1915.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	5.3	.8	14.3	15.8	15.1	21.8	27.1	133	61
II	21.5	....	12.5	10.8	23.3	10.8	21.5	56	68
III	4.8	....	19.1	14.3	23.9	4.8	33.4	21	66
IV	21.7	3.1	22.5	14.8	14.0	14.0	10.1	129	78
V	13.9	4.8	19.3	15.7	12.7	14.5	12.7	166	77
VI	14.9	....	14.9	7.5	7.5	14.9	40.8	27	58
VII	14.8	3.0	38.3	8.9	17.7	5.9	11.8	34	82
VIII	12.4	.9	16.3	12.5	17.2	15.6	25.1	655	65
IX	....	....	7.7	....	15.4	7.7	69.3	13	39
X	5.5	....	14.3	13.6	13.6	15.0	38.1	147	58
XVII	10.2	6.8	13.4	15.8	15.8	10.2	28.1	89	68
XIX	12.2	3.1	21.3	6.1	18.2	15.2	24.3	33	67
XX	4.2	4.2	11.0	13.6	17.3	15.2	34.6	191	60
XXI	7.4	....	12.2	7.4	24.4	9.8	39.1	41	61
XXII	4.4	....	15.3	10.9	15.3	17.4	37.0	46	58
XXIII	1.5	4.3	15.5	4.3	8.5	26.8	39.5	71	54
XXIV	12.2	1.8	15.3	11.6	10.4	17.1	31.7	164	61
Totals	11.7	20.5	16.7	12.6	15.6	15.5	27.1	2,016	65

SUBTRACTION.

	100	90	80	70	60	50	0–49	T.	M.
I	28.6	7.5	26.3	14.3	10.6	7.5	5.3	133	84
II	19.7	1.8	19.7	17.9	12.5	19.7	9.0	56	75
III	27.4	....	22.8	13.7	18.2	4.7	13.7	22	80
IV	38.0	10.9	25.6	14.8	3.9	2.4	4.7	129	89
V	38.0	15.7	18.1	12.7	4.8	6.6	4.2	166	92
VI	39.3	....	14.3	17.9	3.6	7.2	17.9	28	83
VII	38.3	5.9	23.0	17.7	....	8.9	5.9	34	88
VIII	24.6	6.0	22.3	13.9	14.2	7.9	11.0	654	81
IX	23.1	....	....	....	7.7	23.1	46.2	13	53
X	10.2	6.1	17.7	14.9	14.2	14.2	23.0	148	69
XVII	19.2	14.7	24.8	16.9	11.2	3.4	10.2	89	84
XIX	12.2	6.1	24.3	15.2	15.2	9.1	18.2	33	76
XX	12.6	9.4	23.0	16.2	14.1	9.4	15.2	191	77
XXI	24.4	2.5	14.7	14.7	19.6	14.7	9.8	41	75
XXII	2.2	....	17.4	15.3	8.7	15.3	41.4	46	56
XXIII	8.5	5.7	12.7	19.8	13.7	14.1	26.8	71	68
XXIV	20.6	6.1	20.0	9.7	9.7	14.6	19.4	165	77
Totals	23.2	7.4	21.3	14.4	11.6	9.3	13.2	2,019	81

TABLE XLIX. City distributions. Sixth grade. Accuracy. May scores, 1915.

MULTIPLICATION.

	100	90	80	70	60	50	0–49	T.	M.
I	22.2	2.3	22.9	17.6	12.2	7.7	15.3	131	80
II	18.2	....	11.0	12.8	20.9	14.6	23.7	55	66
III	4.8	....	23.9	9.6	23.9	14.3	23.9	21	66
IV	28.3	8.1	29.1	10.5	12.9	6.5	4.9	124	85
V	19.2	12.8	28.9	19.2	11.6	7.1	1.9	156	84
VI	40.8	....	14.9	11.2	7.5	14.9	11.2	27	85
VII	17.7	8.9	44.2	8.9	3.0	8.9	8.9	34	85
VIII	17.5	2.8	24.4	15.6	16.3	9.1	14.4	652	77
IX	15.4	....	23.1	....	7.7	23.1	30.8	13	60
X	12.2	2.6	21.8	10.3	14.8	16.7	21.8	156	68
XVII	12.4	7.9	18.0	15.8	14.7	15.8	15.8	89	73
XIX	19.4	3.4	16.2	26.1	6.5	6.5	6.5	31	79
XX	13.0	8.3	19.7	16.1	15.1	13.0	15.1	193	74
XXI	7.4	4.9	14.7	4.9	22.0	12.2	34.2	41	62
XXII	19.6	....	6.6	....	13.1	24.1	37.0	46	55
XXIII	4.3	2.9	11.5	21.5	11.5	15.8	32.9	70	61
XXIV	40.8	.6	18.4	9.5	12.4	6.5	13.0	169	85
Totals	19.1	4.3	22.2	14.2	14.4	10.7	15.3	2,008	77

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	35.9	5.4	18.3	11.5	16.1	5.4	7.7	131	85
II	36.4	....	21.9	7.3	7.3	14.6	12.8	55	84
III	33.4	....	9.6	9.6	19.1	4.8	23.9	21	75
IV	45.2	7.3	21.0	12.1	6.5	3.3	4.9	124	93
V	48.7	9.6	20.5	5.3	5.3	4.5	5.1	196	99
VI	50.0	....	3.6	10.8	10.8	7.2	17.9	28	100
VII	44.2	3.0	29.5	5.9	....	8.9	8.9	34	89
VIII	32.4	3.4	19.4	10.2	11.2	6.9	16.6	651	83
IX	....	....	....	....	15.4	7.7	77.0	13	35
X	26.9	3.9	16.7	9.6	10.9	6.4	25.7	156	77
XVII	43.9	7.9	18.0	12.4	7.9	5.7	4.5	89	93
XIX	36.7	....	23.4	3.4	6.7	13.4	16.7	30	84
XX	27.9	8.2	25.1	8.2	8.2	7.1	15.3	183	85
XXI	24.4	2.5	9.8	17.1	17.1	14.7	14.7	41	73
XXII	8.7	....	8.7	10.9	8.7	17.4	45.7	46	53
XXIII	18.6	....	12.9	14.4	10.0	12.9	31.5	70	66
XXIV	36.3	.6	19.1	6.0	13.7	7.7	16.7	168	83
Totals	34.1	4.2	19.4	9.0	10.4	7.3	15.9	1,996	84

TABLE L. City distributions. Seventh grade. Addition. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	....	1.8	13.3	12.4	22.2	15.1	13.3	8.9	7.1	3.6	....	.9	.9	....	.9	....	....	....	....	....	....	....	113	8.0
II	....	....	....	2.0	7.7	25.0	21.2	17.4	7.7	15.4	3.9	....	....	....	....	....	....	....	....	....	....	....	....	....	....	52	6.7
III	....	....	2.9	....	....	14.3	20.0	22.9	8.6	20.0	5.8	2.9	2.9	....	....	....	....	....	....	....	....	....	....	....	....	35	7.6
IV	....	....	....	.9	....	.9	5.9	6.8	16.0	9.3	16.8	15.2	11.0	3.4	5.9	1.7	3.4	1.7	....	....	....	....	1.7	....	....	119	10.7
V	....	....	....	....	.7	2.1	7.5	8.9	11.6	23.2	9.5	13.6	9.5	4.8	3.4	2.1	1.4	....	4.8	....	....	....	....	....	1.4	147	9.9
VI	....	....	....	....	....	3.4	6.7	10.0	23.4	10.0	30.1	13.4	....	....	....	....	3.4	....	....	....	....	....	....	....	....	30	9.6
VII	....	....	....	....	....	7.5	3.8	11.2	23.1	15.4	3.8	23.1	3.8	3.8	....	....	3.8	....	....	....	....	....	....	....	....	26	9.3
VIII	....	.3	.5	1.0	2.0	7.2	11.7	18.3	19.4	15.6	8.5	6.4	4.0	2.4	.8	.8	.7	....	.1	....	.1	....	....	....	....	597	8.5
IX	....	....	....	....	7.2	21.5	42.9	21.5	7.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14	6.5
X	....	....	....	2.8	13.7	7.3	20.9	13.7	19.1	8.2	1.9	2.8	6.4	.9	.9	1.9	....	....	....	....	....	....	....	....	....	110	7.4
XVII	....	....	....	....	....	3.8	8.8	8.8	12.5	20.0	13.8	6.3	6.3	7.5	3.8	3.8	1.3	2.5	1.3	....	....	....	....	....	....	80	9.8
XIX	....	....	....	4.6	....	4.6	22.8	22.8	27.3	9.1	4.6	....	....	....	....	4.6	....	....	....	....	....	....	....	....	....	22	7.8
XX	....	....	....	....	1.3	2.6	9.7	9.7	20.0	16.1	13.6	9.0	7.8	6.5	1.3	.7	1.3	....	.7	....	....	....	....	....	....	155	9.4
XXI	....	....	....	....	3.2	5.9	17.7	29.5	20.6	14.8	3.2	....	3.2	....	....	....	....	....	3.2	....	....	....	....	....	....	34	7.8
XXII	....	....	....	3.2	6.3	22.1	22.1	25.0	6.3	12.5	3.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	32	6.9
XXIV	....	....	....	1.2	4.6	9.3	11.6	18.5	18.5	12.7	9.3	4.6	2.9	2.9	....	1.7	1.2	.6	....	....	....	....	....	....	.6	173	8.3
Totals	....	.12	.24	.8	2.7	7.3	12.4	15.4	17.1	15.3	9.1	7.3	5.2	2.7	1.5	1.2	.8	.31	.6	....	.06	....	.12	....	.12	1,739	8.7
Indiana totals	3.91	7.61	11.37	12.04	15.22	13.97	13.81	7.09	6.1	3.49	2.24	1.62	.83	.21	.21	.16	....	....	.05	....	.05	....	....	....	....	1,919	4.9

TABLE LI. City distributions. Seventh grade. Subtraction. Speed. May score, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I			.9				5.3	6.2	12.4	12.4	18.0	12.4	8.0	8.0	6.2	4.5	1.8	3.6			.9					113	10.8
II					2.1	5.9	23.6	27.5	19.7	9.9	5.7	5.7														51	7.7
III						3.0	11.8	14.8	29.5	14.8	3.0	3.0	3.0													34	8.7
IV						1.7	2.6	5.1	11.0	5.9	20.2	11.8	11.9	11.0	5.1	2.6	2.6	2.6	3.4	2.6					.9	119	11.4
V				.7	.7	1.4	4.1	4.8	10.9	8.2	12.9	12.3	7.5	11.6	8.2	6.1	3.4	1.4	2.1	1.4		.7		.7	1.4	147	11.6
VI					3.4			13.4	23.4	23.4	16.7	20.1	3.4	10.0	6.7		3.4									30	9.6
VII							7.5		11.2	11.2	7.5	11.2	9.3		11.2	7.5	7.5		3.8							26	12.0
VIII	.7	.1	.1	.5	.7	1.3	3.5	9.0	13.2	13.2	15.9	13.7	8.5	6.4	4.3	2.8	1.8	.7	1.3	.7	.3	.3	.1	.5		598	10.5
IX				14.3	7.2	14.3	42.9	14.3		7.2																14	6.3
X				.9	.9	2.7	14.5	15.4	15.4	14.5	12.7	4.5	7.3	3.6	1.8	.9	.9	3.6	.9							111	9.1
XVII						1.3	3.8	7.5	8.8	13.8	15.0	10.0	12.5	5.0	3.8	6.3	2.5	5.0	2.5		1.3		1.3			80	11.0
XIX							4.6	4.6	22.8	18.2	13.7	13.7	9.1	9.1		4.6										22	10.0
XX							.7		11.6	12.8	16.7	22.4	9.6	7.7	9.6	3.9	2.6	1.9		.7						156	11.4
XXI							11.8	17.7	11.8	11.8	23.6	5.9	5.9	3.2		3.2		5.9								34	9.8
XXII						12.5	3.2	9.4	25.0	18.8	6.3	12.5	3.2	9.4												32	9.0
XXIV				1.2	.6	.6	9.8	8.1	9.8	17.8	14.9	15.5	6.3	4.6	1.7	1.7	1.7	1.2	.6	1.2	.6	.6	.6		1.2	174	10.1
Totals	.24	.06	.12	.43	.6	1.5	6.0	8.5	13.0	12.3	15.4	12.4	8.5	6.5	4.8	3.0	1.8	1.5	1.2	.61	.24	.18	.12	.24	.18	1,643	10.0
Indiana standard	1.3	1.25	1.82	4.64	8.04	10.44	11.39	14.09	14.04	10.75	8.13	6.42	3.45	2.03	1.56	.73	.47	.31	.16	.16	.05	.05				1,916	7.8

TABLE LII. City distributions. Seventh grade. Multiplication. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I						.9	5.0	10.9	12.8	20.0	17.3	8.2	3.7	6.4	6.4	4.6	1.9	.9	.9	.9						110	10.0
II					6.2	12.3	20.5	22.5	20.5	10.3	8.2															49	7.5
III				6.0	3.0	3.0	12.0	18.0	15.0	18.0	15.0	3.0	3.0		3.0	3.0										34	8.6
IV	.9		.9	2.6		3.5	12.0	10.3	10.3	16.3	11.1	12.0	6.0	6.0	3.5	1.7	1.7		.9		.9					117	9.6
V				1.4		2.1	4.2	9.1	7.0	14.0	15.4	9.8	10.5	7.7	8.4	4.9	2.8	2.1		.7					1.4	145	10.8
VI						6.7	3.4	16.7	16.7	6.7	20.0	23.4	3.4	3.4												30	10.0
VII						3.9	11.6	7.7	3.9		23.1	3.9	7.7	7.7	11.6	11.6	7.7									26	11.0
VIII	.3		.7	1.3	1.8	7.4	8.3	14.6	15.8	14.3	12.8	8.3	5.2	3.9	2.5	1.8	.7	.3								595	9.0
IX			14.3	14.3	14.3	42.9	21.5																			14	5.2
X			2.6	3.5	3.5	6.0	13.7	11.1	16.3	11.1	11.1	7.7	3.5	2.6	1.7	4.3		1.7								117	8.6
XVII				1.3		6.3	11.3	15.0	11.3	12.5	12.5	5.0	7.5	10.0		5.0	1.3		1.3							80	9.4
XIX						4.6	9.1	9.1	4.6	13.7	27.3	13.7	4.6		4.6	9.1										22	10.3
XX						1.3	5.2	11.0	12.3	11.6	18.7	16.8	10.3	5.8	1.3	4.5	.7	.7								155	10.5
XXI				3.0	3.0	5.9	26.5	20.6	26.5		5.9	5.9		3.0												34	7.6
XXII				3.2		6.3	9.4	34.4	12.5	15.7	6.3	9.4		3.2												32	7.9
XXIV					4.2	4.8	9.5	10.7	10.7	11.9	21.4	8.9	4.8	3.6	3.6	1.8	1.2	.6	1.2		.6				.6	168	9.9
Totals	.06	.12	.5	1.3	1.4	5.8	10.5	15.0	15.1	14.5	12.0	9.0	4.9	3.9	2.0	2.3	.9	.4	.24	.12	.12				.12	1,728	9.0
Indiana standard	2.25	4.54	6.64	10.34	13.16	15.03	13.42	10.91	9.24	6.48	4.02	2.09	1.2	.36	.1	.16	.1	.05								1,917	5.9

TABLE LIII. City distributions. Seventh grade. Division. Speed. May score, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	....	.9	7.3	10.9	7.3	16.4	9.1	16.4	6.4	10.0	7.3	.9	2.8	.9	1.9	.9	....	....	....	.9	....	....	110	9.8
II	....	2.1	12.3	6.2	30.7	10.3	18.4	8.2	4.1	6.2	....	2.1	....	....	....	....	....	....	....	....	....	....	....	....	....	49	4.9
III	....	....	6.0	6.0	3.0	3.0	15.0	12.0	15.0	12.0	9.0	3.0	3.0	....	....	....	....	....	....	....	....	....	....	....	....	34	8.4
IV	....	....	....	2.6	4.3	3.5	9.4	9.4	11.1	7.7	13.7	6.9	9.4	4.3	5.2	1.7	4.0	1.7	2.6	.9	.9	.9	....	....	....	117	10.2
V	....	....	.7	.7	2.1	4.2	7.6	10.4	15.9	9.0	13.8	6.2	9.0	6.9	2.8	4.8	....	.7	.7	....	....	....	....	....	1.4	145	10.0
VI	....	....	....	3.4	3.4	13.4	20.0	13.4	16.7	10.0	3.4	....	10.0	3.4	....	....	....	....	3.4	....	....	....	....	....	....	30	7.8
VII	....	....	....	3.9	3.9	7.7	7.7	15.4	3.9	7.7	7.7	....	7.7	7.7	15.4	11.6	....	....	....	....	....	....	....	....	....	26	10.0
VIII	....	1.0	1.2	4.3	9.8	10.5	12.6	8.4	13.1	10.8	7.4	5.2	7.7	4.3	1.7	.1	.7	.3	.5	.1	....	....	....	....	....	594	8.2
IX	....	....	14.3	57.2	14.3	14.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14	3.6
X	....	.9	2.6	7.8	11.2	11.2	13.8	6.9	13.0	7.8	.9	2.6	7.8	.9	....	.9	2.6	1.8	.9	2.6	1.8	....	....	1.8	.9	116	7.4
XVII	....	....	1.3	7.5	8.8	7.5	11.3	13.8	12.5	12.5	7.5	2.5	6.3	5.0	3.8	....	....	....	....	....	....	....	....	....	....	80	8.0
XIX	....	....	....	....	9.1	4.6	13.7	13.7	27.3	13.7	4.6	9.1	....	....	....	....	5.0	....	....	....	....	....	....	....	....	22	8.3
XX	....	....	....	.7	1.9	6.4	6.4	7.7	19.8	10.2	19.8	6.4	12.2	3.9	2.6	1.3	.7	....	.7	....	....	....	....	....	....	157	9.8
XXI	....	....	3.0	3.0	20.6	14.8	17.7	17.7	5.9	....	5.9	....	3.0	5.9	3.0	....	....	....	....	....	....	....	....	....	....	34	6.5
XXII	....	3.2	....	6.3	12.5	6.3	12.5	21.9	9.4	12.5	6.3	3.2	3.2	....	3.2	....	....	....	....	....	....	....	....	....	....	32	7.4
XXIV	....	....	.6	3.0	11.3	15.5	10.7	10.1	11.9	8.3	3.6	5.4	8.9	4.2	2.4	1.8	1.8	....	....	....	....	....	1.8	....	....	168	7.9
Totals	.24	.24	1.17	2.5	4.9	5.6	8.2	9.5	13.9	10.4	12.3	7.9	8.2	4.6	3.0	2.1	1.7	.7	1.0	.49	.31	.19	.12	.31	.19	1,634	9.3
Indiana standard	3.67	8.57	5.96	7.61	9.26	8.3	9.42	10.74	10.06	7.93	6.65	4.47	3.83	2.23	1.81	1.43	.69	.42	.32	.16	.05	....	.05	....	....	1,880	6.7

TABLE LIV. City distributions. Seventh grade. Accuracy. May scores, 1915. Per cent of children making each score.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	2.7	1.8	8.9	12.4	13.3	19.5	41.6	113	55
II	3.9	2.0	21.2	11.6	25.0	17.4	19.4	52	65
III	20.0	3.1	20.0	5.8	11.5	25.8	14.3	35	70
IV	9.3	9.3	14.3	16.8	13.5	10.1	26.9	119	70
V	15.0	6.8	21.1	15.7	15.7	8.9	17.0	147	76
VI	13.4	6.7	13.4	13.4	16.7	16.7	20.0	30	68
VII	....	3.9	34.7	15.4	15.4	7.7	23.1	26	73
VIII	13.4	4.0	17.8	17.3	12.2	12.6	22.9	597	71
IX	....	....	7.2	7.2	21.5	14.3	50.0	14	50
X	7.3	1.9	14.6	19.1	20.9	12.8	23.7	110	67
XVII	12.5	7.5	15.1	12.5	18.8	10.0	23.8	80	69
XIX	9.1	....	13.7	13.7	13.7	31.9	18.2	22	60
XX	.4	.4	12.9	16.8	12.9	11.0	38.7	155	60
XXI	3.0	....	14.8	5.9	14.8	17.7	44.2	34	53
XXII	....	....	25.0	9.4	15.7	12.5	37.5	32	60
XXIV	8.7	3.5	15.6	11.6	12.1	13.9	34.7	173	61
Totals	9.7	4.0	16.1	15.4	14.3	13.6	27.1	1,739	67

SUBTRACTION.

	100	90	80	70	60	50	0–49	T.	M.
I	16.0	11.5	25.7	22.2	11.5	9.8	4.5	113	81
II	23.1	2.0	19.3	21.2	17.4	7.7	7.7	51	78
III	35.3	11.8	23.6	11.8	5.9	8.6	3.0	34	88
IV	20.2	21.0	24.4	15.2	10.1	5.9	3.4	119	86
V	24.5	14.3	32.0	11.6	10.2	4.1	3.4	147	87
VI	33.4	10.0	26.7	13.4	16.7	....	....	30	88
VII	27.0	11.6	34.7	11.6	3.9	....	11.6	26	87
VIII	19.6	14.9	25.1	14.8	9.8	7.6	8.4	598	84
IX	7.2	....	21.5	....	14.3	7.2	50.0	14	50
X	23.5	4.5	17.2	17.2	18.1	10.9	9.0	111	77
XVII	21.3	13.8	26.3	18.8	12.5	3.8	3.8	80	84
XIX	22.8	9.1	22.8	9.1	13.7	13.7	9.1	22	82
XX	14.1	11.6	24.4	11.6	12.2	15.4	10.9	156	80
XXI	3.0	3.0	17.7	32.4	11.8	14.8	17.7	34	72
XXII	6.3	18.8	21.9	34.4	12.5	3.2	3.2	32	79
XXIV	8.1	5.2	18.4	17.2	17.8	15.5	17.8	174	69
Totals	19.2	12.6	24.7	16.1	11.6	8.3	7.7	1,643	83

TABLE LV. City distributions. Seventh grade. Accuracy. May scores, 1915. Per cent of children making each score.

MULTIPLICATION.

	100	90	80	70	60	50	0–49	T.	M.
I	10.0	12.8	23.7	23.7	15.5	9.1	5.5	110	88
II	22.5	2.1	24.5	12.3	18.4	12.3	8.2	49	80
III	14.8	5.9	38.3	5.9	14.8	14.8	8.9	34	82
IV	18.8	12.0	20.5	18.0	15.4	2.6	12.9	117	81
V	20.7	11.7	26.2	21.4	8.3	8.3	3.5	145	83
VI	23.4	16.7	23.4	13.4	6.7	10.0	6.7	30	85
VII	11.6	7.7	34.7	15.4	23.1	7.7	....	26	81
VIII	14.0	7.4	25.6	17.6	15.0	9.2	11.3	595	78
IX	14.3	....	14.3	....	28.6	7.2	35.8	14	63
X	12.0	5.2	17.1	17.1	14.6	12.0	22.3	117	71
XVII	16.3	7.5	20.0	10.0	23.8	8.8	13.8	80	73
XIX	18.2	13.7	27.3	13.7	18.2	4.6	4.6	22	83
XX	14.2	12.9	27.1	16.8	8.4	10.3	10.3	155	82
XXI	5.9	....	14.8	17.7	23.6	11.8	26.5	34	65
XXII	9.4	6.3	31.3	15.7	6.3	12.5	18.8	32	78
XXIV	7.7	6.6	18.5	21.4	19.7	10.7	15.5	168	72
Totals	14.6	4.6	22.0	15.4	13.3	12.7	17.8	1,728	78

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	29.1	16.4	24.6	11.9	8.2	8.2	1.9	110	88
II	36.8	....	18.4	12.3	8.2	12.3	12.3	49	84
III	55.9	....	17.7	8.9	5.9	3.0	8.9	34	100
IV	28.2	9.4	18.0	13.7	12.0	5.2	13.7	117	83
V	44.8	12.4	20.7	9.0	6.9	2.8	3.5	145	96
VI	53.4	3.4	16.7	3.4	6.7	8.4	13.4	30	100
VII	42.4	11.6	7.7	15.4	11.6	3.9	7.7	26	93
VIII	35.2	7.4	26.0	12.1	11.1	5.9	8.3	594	86
IX	14.3	....	7.2	....	28.6	14.3	35.8	14	60
X	32.8	6.1	13.8	9.5	8.7	9.5	19.9	116	83
XVII	45.1	16.3	18.8	8.8	7.5	8.8	5.0	80	98
XIX	41.0	4.6	27.3	18.2	4.6	4.6	....	22	88
XX	31.9	14.0	30.3	35.1	8.3	5.1	6.4	157	89
XXI	20.6	8.9	20.6	11.8	8.9	8.9	20.6	34	80
XXII	28.2	....	18.8	18.8	6.3	15.7	12.5	32	78
XXIV	28.0	10.7	20.8	9.5	10.7	8.3	11.9	168	85
Totals	35.0	8.3	20.3	10.9	10.2	6.4	9.4	1,634	87

TABLE LVI. City distributions. Eighth grade. Addition. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	....	....	3.3	10.9	5.4	16.2	18.3	15.1	10.9	10.9	2.2	3.3	2.2	2.2	....	....	....	....	....	....	....	....	93	9.8
II	....	....	....	....	4.3	6.4	6.4	23.5	25.6	17.1	4.3	4.3	2.2	4.3	2.2	....	....	....	....	....	....	....	....	....	....	47	8.4
III	....	....	....	....	....	....	6.7	16.7	13.4	23.4	13.4	6.7	13.4	3.4	3.4	....	....	....	....	....	....	....	....	....	....	30	9.6
IV	....	....	....	....	1.0	....	1.9	1.9	10.5	8.6	16.2	12.4	14.3	9.6	11.5	4.8	1.0	1.0	1.0	1.0	1.0	2.9	....	....	....	105	11.8
V	....	....	....	....	....	2.6	3.4	8.5	11.9	13.6	18.7	16.1	10.2	5.1	3.4	2.6	2.6	1.7	....	....	....	....	....	....	....	118	10.5
VI	....	....	....	....	....	6.3	6.3	31.3	18.8	12.5	12.5	6.3	6.3	....	....	....	....	....	....	....	....	....	....	....	....	16	8.5
VII	....	....	....	....	9.1	4.6	....	4.6	9.1	18.2	22.8	9.1	9.1	4.6	4.6	4.6	....	....	....	....	....	....	....	....	....	22	10.2
VIII	....	.1	....	....	.5	1.5	9.6	11.6	16.8	14.3	14.3	11.3	5.2	6.1	2.1	2.9	1.0	1.0	.6	.4	....	.1	.1	....	....	512	9.7
IX	....	....	....	....	....	10.0	30.0	15.1	25.0	15.1	5.0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	7.7
X	....	....	....	....	2.1	6.2	8.2	14.4	21.9	15.1	11.7	4.8	6.2	3.4	2.8	.7	1.4	....	....	1.4	....	....	....	....	....	146	8.9
XVII	....	....	....	....	1.4	2.6	6.5	10.4	15.6	15.6	11.7	15.6	6.5	9.3	3.9	1.4	....	....	....	....	....	....	....	....	....	77	9.8
XIX	....	....	....	....	....	3.8	3.8	11.2	29.7	22.3	18.6	3.8	3.8	3.8	....	....	....	....	....	....	....	....	....	....	....	27	9.2
XX	....	....	....	....	....	2.0	4.0	8.0	9.0	15.0	15.0	19.0	12.0	7.0	5.0	2.0	1.0	....	....	1.0	....	....	....	....	....	100	10.8
XXI	....	....	....	....	....	....	6.5	13.2	9.7	9.7	19.4	25.9	6.5	6.5	3.3	....	....	....	....	....	....	....	....	....	....	31	10.7
XXII	....	....	....	2.7	5.3	....	10.6	10.6	18.5	18.5	7.9	15.8	5.3	....	2.7	....	....	2.7	....	....	....	....	....	....	....	38	9.1
XXIII	....	....	....	....	....	1.5	6.0	10.5	22.4	10.5	23.9	7.5	7.5	3.0	6.0	....	1.5	....	....	....	....	....	....	....	....	67	10.0
XXIV	....	....	....	....	1.2	4.2	17.2	19.5	13.0	13.6	11.3	10.1	3.6	1.2	1.8	....	1.8	1.2	....	....	....	....	....	....	....	169	8.6
Totals	....	.07	....	.07	.9	2.5	7.8	10.9	16.7	13.3	14.8	11.6	8.2	5.4	3.6	2.1	1.0	.63	.35	.42	.07	.2	.07	....	.6	1,618	9.8
Indiana standard	....	.06	.3	.79	2.65	15.53	10.6	13.66	17.31	15.96	11.81	8.11	5.1	3.1	1.83	1.22	1.1	.49	.12	.18	....	.12	....	.06	.12	1,647	10.2

TABLE LVII. City distributions. Eighth grade. Subtraction. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	....	....	....	....	3.3	10.9	7.7	9.8	17.3	18.3	8.7	5.4	5.4	5.4	2.2	2.2	2.2	1.1	....	1.1	....	....	93	12.1
II	....	....	....	2.1	2.1	2.1	18.8	10.6	18.8	25.0	12.5	6.3	....	2.1	....	....	....	....	....	....	....	....	....	....	....	48	8.8
III	....	....	....	....	....	3.4	....	16.7	3.4	20.0	10.0	23.4	10.0	6.7	....	....	....	....	3.4	3.4	....	....	....	....	....	30	10.7
IV	....	....	....	....	....	....	....	....	7.7	6.7	7.7	9.6	11.5	13.4	9.6	10.5	8.0	2.9	5.8	4.8	1.9	....	....	....	1.0	105	13.6
V	....	....	....	....	....	....	....	.9	3.4	6.8	6.0	16.1	11.1	8.5	11.9	6.8	6.8	7.7	4.3	1.7	.9	3.4	....	2.0	.9	1.7	118	12.7
VI	....	....	....	....	....	....	....	....	12.5	12.5	6.3	37.5	12.5	6.3	6.3	6.3	....	....	....	....	....	....	....	....	....	16	10.5
VII	....	....	....	....	....	....	....	....	4.6	18.2	4.6	18.2	9.1	13.7	9.1	9.1	4.6	4.6	....	....	4.6	....	....	....	....	22	12.5
VIII	.5	....	.4	....	.1	.5	1.6	2.7	8.6	10.8	15.8	11.1	12.5	8.4	7.8	4.7	3.7	3.7	1.5	1.5	1.8	.6	.5	.1	.4	512	11.8
IX	....	....	....	5.0	....	5.0	10.0	30.0	25.0	10.0	10.0	5.0	....	....	....	....	....	....	....	....	....	....	....	....	....	20	8.0
X	....	....	....	....	....	....	3.4	9.0	17.8	14.5	17.9	9.0	10.4	2.8	2.8	2.8	4.2	2.8	1.4	.7	....	.7	....	....	....	145	10.3
XVII	....	....	....	....	....	....	7.8	5.3	17.2	9.3	14.3	13.2	11.7	6.5	2.6	5.3	1.4	2.6	1.4	....	1.4	1.4	....	....	....	77	10.9
XIX	....	....	....	....	....	....	....	7.5	14.9	11.2	22.3	11.2	11.2	3.8	7.5	....	....	....	....	....	....	....	....	....	....	27	10.8
XX	....	....	....	....	....	....	2.0	....	4.0	5.0	12.0	10.0	17.0	15.0	10.0	7.0	4.0	7.0	3.0	1.0	2.0	1.0	....	....	....	100	13.0
XXI	....	....	....	....	....	....	3.3	3.3	6.5	6.5	13.0	16.2	22.6	6.5	9.7	3.3	....	3.3	....	....	3.3	....	....	3.3	....	31	12.1
XXII	....	....	....	....	2.7	....	2.7	2.7	18.8	7.9	21.1	18.2	7.9	2.7	2.7	13.2	....	5.3	2.7	....	....	....	....	....	....	38	10.9
XXIII	....	....	....	....	....	....	6.0	9.0	12.0	10.5	22.4	15.0	4.5	9.0	3.0	4.5	1.5	3.0	....	....	....	....	....	....	....	67	10.6
XXIV	....	....	....	....	1.2	2.4	5.9	7.1	15.4	11.8	13.0	11.8	7.7	7.7	5.3	1.2	3.0	.6	....	3.0	.6	....	.6	1.8	....	169	10.5
Totals	.21	....	.14	.14	.21	.42	2.7	4.6	10.6	10.3	15.2	12.6	11.6	7.2	2.7	5.8	3.8	3.4	1.8	1.3	1.4	.56	.42	.21	.35	1,618	11.5
Indiana standard	....	....	.67	.48	1.16	1.34	2.44	4.44	8.95	14.12	14.42	12.48	10.05	9.27	6.41	2.99	3.29	2.56	1.22	1.16	.91	.55	.3	.24	.3	1,644	11.2

TABLE LVIII. City distributions. Eighth grade. Multiplication. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	....	1.2	3.3	3.3	4.4	5.5	8.8	9.9	11.0	15.4	14.3	9.9	3.3	2.2	2.2	3.3	....	2.2	....	....	....	....	91	12.2
II	....	....	....	....	8.4	8.4	27.1	15.0	23.0	8.4	4.2	2.1	4.2	....	....	....	....	....	....	....	....	....	....	....	....	48	7.4
III	....	....	....	....	....	4.6	9.1	4.6	9.1	18.2	18.2	13.7	13.7	5.0	....	....	....	....	4.6	....	....	....	....	....	....	22	10.2
IV	....	....	....	....	....	1.0	2.0	3.9	6.8	7.7	11.6	16.4	12.5	5.8	14.5	5.8	5.8	3.9	1.0	....	1.0	....	....	....	....	104	12.0
V	....	....	....	....	....	....	2.5	4.1	2.5	5.8	9.9	9.9	4.9	8.2	10.7	4.9	7.4	3.3	9.0	3.3	2.5	2.5	3.3	.9	1.7	122	14.2
VI	....	....	....	....	....	....	6.3	18.8	6.3	12.5	25.0	18.8	6.3	....	....	....	....	....	6.3	....	....	....	....	....	....	16	10.2
VII	....	....	....	....	....	4.6	4.6	4.6	....	4.6	22.8	4.6	18.2	13.7	9.1	9.1	4.6	....	....	....	....	....	....	....	....	22	12.3
VIII	....	.2	....	.2	1.2	2.4	4.3	7.3	12.3	12.8	13.0	15.2	7.9	8.9	5.9	3.8	2.0	2.0	.6	.2	....	....	....	.4	....	507	10.7
IX	....	....	....	5.1	30.0	25.4	15.0	15.0	5.1	5.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	5.6
X	....	....	....	.7	2.8	2.8	7.8	12.7	9.2	10.2	12.7	12.0	9.2	4.9	2.8	3.5	.7	1.4	....	....	.7	....	....	....	....	142	9.9
XVII	....	....	....	....	....	3.9	3.9	10.4	11.7	16.2	10.4	14.3	13.0	5.2	3.9	2.6	....	2.6	1.3	....	....	....	....	....	....	77	10.4
XIX	....	....	....	....	3.8	....	....	....	7.5	18.6	18.6	26.0	11.2	3.8	....	7.5	3.8	....	....	....	....	....	....	....	....	27	11.4
XX	....	....	....	....	....	2.2	....	4.3	5.3	5.3	17.9	20.9	9.5	12.7	3.2	5.3	4.3	5.3	3.2	2.2	....	....	....	....	....	95	11.7
XXI	....	....	....	....	....	....	....	6.5	9.7	13.0	16.2	16.2	3.3	13.0	3.3	6.5	6.5	6.5	....	....	....	....	....	....	....	31	11.4
XXII	....	....	....	....	....	5.3	13.2	2.7	10.6	13.2	15.8	5.3	2.7	10.6	10.6	2.7	2.7	2.7	2.7	....	....	....	....	....	....	38	10.3
XXIII	....	....	1.5	1.5	1.5	4.5	10.5	6.0	16.5	10.5	10.5	20.9	6.0	3.0	2.0	3.0	3.0	....	....	....	....	....	....	....	....	67	9.9
XXIV	....	....	....	.6	.6	1.8	7.8	10.2	10.2	17.4	12.0	11.4	8.4	6.0	5.4	4.2	2.4	.6	1.2	....	....	....	....	....	....	167	10.2
Totals	....	.07	.07	.29	1.6	2.9	5.3	7.1	9.8	11.5	12.8	13.8	8.8	7.9	5.8	3.9	2.7	2.1	1.7	.5	.5	.21	.29	.21	.14	1,596	10.9
Indiana standard	....	....	....	.91	.79	3.34	7.62	10.13	10.74	13.19	14.94	12.3	9.03	6.65	10.6	2.93	1.58	.85	.18	.79	.3	.06	....	....	....	1,647	10.2

TABLE LIX. City distributions. Eighth grade. Division. Speed. May scores, 1915. Per cent of children making each score.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	T.	M.
I	....	....	....	1.2	....	2.2	2.2	2.2	9.9	15.4	9.9	13.2	15.4	8.8	9.9	4.4	2.2	1.2	1.2	1.2	....	....	....	....	....	91	11.6
II	....	....	....	4.2	18.8	27.1	12.5	6.3	18.8	6.3	4.2	....	2.1	....	....	....	....	....	....	....	....	....	....	....	....	48	6.0
III	....	....	....	4.6	4.6	13.7	9.1	4.6	9.1	13.7	4.6	4.6	22.8	4.6	....	....	....	....	....	4.6	....	....	....	....	....	22	9.3
IV	....	....	....	....	3.9	3.9	2.9	8.7	8.7	11.6	8.7	3.9	10.6	10.6	12.5	6.8	2.9	2.0	....	1.0	....	....	1.0	....	1.0	104	11.5
V	....	....	....	....	3.3	3.3	2.5	9.9	14.8	7.4	5.8	9.9	13.1	9.0	3.3	5.8	2.5	1.7	1.7	3.3	1.7	1.7	....	....	....	122	11.3
VI	....	....	....	6.3	....	12.5	....	12.5	6.3	....	25.0	....	6.3	25.0	....	....	....	....	....	....	6.3	....	....	....	....	161	10.5
VIII	....	....	.6	1.6	3.7	5.5	9.0	4.9	13.4	10.2	8.1	5.9	14.4	6.5	3.3	4.7	3.7	1.4	1.4	1.0	....	.4	....	.2	.2	492	10.2
IX	....	....	15.0	5.1	40.0	15.0	15.0	5.1	5.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	20	4.8
X	....	.7	.7	1.4	2.1	10.5	6.3	7.7	15.4	10.5	6.3	5.6	9.1	3.5	2.8	2.8	3.5	4.2	1.4	1.4	2.1	.7	.7	.7	....	143	9.5
XVII	....	....	....	1.3	1.3	10.4	11.7	7.8	19.5	5.2	7.8	5.2	10.4	3.9	2.6	3.9	3.9	2.6	1.3	1.3	....	....	....	....	....	77	8.9
XIX	....	....	....	....	11.2	....	14.9	14.9	11.2	11.2	14.9	....	14.9	3.8	....	....	3.8	....	....	....	....	....	....	....	....	27	9.0
XX	....	....	....	....	....	....	6.4	3.2	10.6	6.4	13.7	4.3	16.9	12.7	6.4	5.3	7.4	5.3	2.2	....	....	....	....	....	....	95	12.4
XXI	....	....	....	....	....	3.3	6.5	....	16.2	13.0	9.7	13.0	9.7	16.2	6.5	6.5	....	....	....	....	....	....	....	....	....	31	11.3
XXII	....	....	....	....	10.6	7.9	10.6	7.9	10.6	7.9	15.8	5.3	13.2	5.3	2.7	....	....	....	....	....	....	....	2.7	....	....	38	9.3
XXIII	....	....	....	3.0	7.5	4.5	12.0	13.5	16.5	15.0	6.0	6.0	9.0	4.5	1.5	....	1.5	....	....	....	....	....	....	....	....	67	8.6
XXIV	....	....	.6	1.8	7.2	7.8	11.4	9.0	13.2	10.2	7.2	10.2	9.6	5.4	.6	3.6	.6	.6	.6	....	.6	....	....	....	....	167	8.9
Totals	....	.07	.51	1.4	4.3	6.3	7.5	6.3	13.3	9.7	8.4	6.0	12.5	7.0	4.2	3.9	3.1	1.8	1.0	1.2	.42	.36	.22	.15	.15	1,393	10.9
Indiana standard	.18	.12	.48	2.07	4.38	2.86	4.8	10.27	10.39	8.76	9.66	7.5	10.09	7.74	5.22	6.1	4.07	2.19	1.52	.55	.55	.12	.12	.18	.24	1,646	10.6

TABLE LX. City distributions. Eighth grade. Accuracy. May scores, 1915. Per cent of children making each score.

ADDITION.

	100	90	80	70	60	50	0–49	T.	M.
I	8 7	3 3	19 4	10 8	**20 5**	15 1	22 6	93	66
II	8 6		10 7	19 2	**10 7**	19 2	32 0	47	60
III	6 7		20 0	13 4	**16 7**	23 4	20 0	30	64
IV	15 3	18 1	**20 0**	16 2	11 5	12 4	6 7	105	82
V	16 1	14 4	15 8	**17 8**	12 7	14 4	9 4	118	78
VI	12 5		6 3	25 0	**12 5**	6 3	37 5	16	65
VII	4 6	18 2	13 7	**27 3**	18 2		18 2	22	75
VIII	12 1	7 8	19 7	**18 5**	14 9	12 9	14 1	512	74
IX	5 0		30 0	**15 0**	10 0	20 0	20 0	20	70
X	4 8	4 8	14 4	14 4	**14 4**	16 5	30 8	146	62
XVII	10 4	11 7	11 7	**15 6**	13 0	19 5	18 3	77	70
XIX		3 8	18 6	18 6	**14 9**	11 2	33 4	27	65
XX	8 0	12 0	13 0	15 0	**13 0**	13 0	26 0	100	68
XXI	3 3	3 3	19 4	**25 9**	18 0	3 3	32 3	31	71
XXII	5 3	2 7	26 4	10 6	**23 7**	15 8	15 8	38	68
XXIII	1 5	3 1	6 0	16 5	12 0	**12 0**	49 3	67	51
XXIV	10 7	5 9	13 6	**21 3**	13 6	13 6	21 3	169	71
Totals	9 8	8 0	17 2	**17 0**	14 5	14 0	20 1	1,618	71

SUBTRACTION.

	100	90	80	70	60	50	0–49	T.	M.
I	18 3	19 4	**24 8**	19 4	6 5	7 6	4 4	93	85
II	12 5	2 1	**37 5**	16 7	12 5	10 5	8 4	48	87
III	26 7	16 7	23 4	6 7	13 4	6 7	6 7	30	84
IV	26 7	**26 7**	23 9	11 5	9 6	1 0	1 0	105	91
V	19 5	22 1	**26 3**	16 1	10 2	3 4	2 6	118	87
VI	12 5	**37 5**	25 0	12 5		6 3	6 3	16	90
VII	13 7	18 2	**45 5**	9 1	9 1		5 0	22	86
VIII	27 0	18 8	**19 7**	17 0	8 0	4 3	5 3	512	88
IX	25 0		**45 0**		15 0	10 0	5 0	20	84
X	15 9	10 4	**24 2**	20 0	6 9	7 6	15 2	145	80
XVII	28 6	15 6	**20 8**	16 9	6 5	6 5	5 2	77	88
XIX	14 9	18 6	**33 4**	3 8	7 5	7 5	14 9	27	86
XX	16 0	23 0	**23 0**	14 0	12 0	6 0	6 0	100	85
XXI	19 4	13 0	**25 9**	9 7	22 6	9 7		31	84
XXII	10 6	15 8	**29 0**	15 8	15 8	7 9	5 3	38	82
XXIII	16 0	16 0	15 0	13 5	**18 0**	16 5	25 4	67	65
XXIV	10 1	8 9	24 3	**18 4**	11 3	8 3	18 9	169	76
Totals	22 4	18 4	**24 7**	12 0	10 0	6 1	7 1	1,618	86

TABLE LXI. City distributions. Eighth grade. Accuracy. May scores, 1915. Per cent of children making each score.

MULTIPLICATION.

	100	90	80	70	60	50	0–49	T.	M.
I	16.5	11.0	24.2	16.5	17.6	8.8	5.5	91	81
II	18.8	2.1	14.6	23.0	14.6	10.5	16.7	48	73
III	18.2	18.2	13.7	18.2	18.2	13.7	....	22	80
IV	24.1	22.2	22.2	17.4	10.6	2.9	1.0	104	88
V	25.4	19.7	20.4	10.7	6.6	4.9	2.5	122	88
VI	19.1	12.0	12.5	....	19.1	12.5	12.5	16	85
VII	18.2	....	41.0	22.8	9.1	9.1	....	22	82
VIII	17.7	13.2	24.4	19.3	9.7	8.5	7.1	507	82
IX	10.0	....	10.0	20.0	20.0	10.0	30.0	20	65
X	14.1	6.4	20.4	18.3	14.8	13.4	12.7	142	75
XVII	15.6	15.6	29.9	13.0	10.4	10.4	5.2	77	84
XIX	7.5	22.3	22.3	26.0	11.2	3.8	7.5	27	82
XX	21.1	17.9	26.4	23.2	7.4	1.1	3.2	95	86
XXI	3.3	13.0	25.9	22.6	13.0	9.7	13.0	31	77
XXII	10.6	13.2	31.6	21.1	15.8	2.7	5.3	38	82
XXIII	4.5	16.0	18.0	7.5	22.4	19.5	22.4	67	64
XXIV	10.2	6.0	19.8	26.4	16.8	13.2	7.8	167	75
Totals	17.8	13.4	24.2	17.8	11.9	8.5	7.7	1,596	82

DIVISION.

	100	90	80	70	60	50	0–49	T.	M.
I	31.9	16.5	22.0	13.2	11.0	2.2	3.3	91	90
II	27.1	2.1	31.3	6.3	14.6	6.3	12.5	48	83
III	18.2	18.2	31.9	....	13.7	4.6	13.7	22	86
IV	47.2	19.3	15.4	11.6	2.9	1.0	2.9	104	99
V	48.4	18.1	18.9	10.7	.9	1.7	1.7	122	99
VI	19.1	12.5	25.0	6.3	19.1	12.5	19.1	16	82
VII	....	....	....	....	....	....	....	....	....
VIII	47.0	17.1	19.9	6.3	6.5	3.3	6.3	492	94
IX	15.0	....	15.0	25.0	10.0	15.0	20.0	20	72
X	33.6	12.6	20.3	9.1	10.5	4.2	9.8	143	88
XVII	50.7	9.1	20.8	5.2	14.3	....	....	77	100
XIX	18.6	7.5	29.7	8.0	11.2	7.5	18.6	27	83
XX	37.9	17.9	30.6	6.4	1.1	3.2	3.2	95	94
XXI	19.4	22.6	25.9	9.7	6.5	9.7	6.5	31	88
XXII	29.0	15.8	26.4	10.6	10.6	....	7.9	38	88
XXIII	20.9	7.5	19.5	12.6	16.5	7.5	16.5	67	79
XXIV	27.6	10.8	24.0	10.8	10.8	7.8	8.4	167	85
Totals	37.4	15.1	21.5	8.4	7.7	3.5	6.5	1,393	92

CHAPTER II.

Standards, or the Score which a Pupil Should Make.

THE NEED FOR STANDARDS.

Suppose an eighth-grade pupil makes a score of 9 examples attempted and 7 right when taking the addition test. In order to determine the merit of this score it is necessary to know what score an eighth-grade pupil should make when taking the addition test. In other words, a standard is necessary before we can interpret the scores of a pupil or of a class. If the standard in addition for an eighth-grade pupil were 8 examples attempted and 6 right, the pupil who makes a score of 9 examples attempted and 7 right possesses superior ability. But if the standard in addition for an eighth-grade pupil is 12 examples attempted and 11 right, the pupil with a score of 9 examples attempted and 7 right is inferior in ability to do three-column additions. Thus, the meaning which we may attach to a score depends as much upon the standard as upon the score itself.

The need for standards which have been scientifically determined and which are uniform becomes apparent when we consider the results which were obtained by giving the Standard Research Tests in Kansas. Take, for example, the May median scores for the eighth grade. These scores for multiplication are represented graphically in figure II. (See page 8 for directions for reading this figure.) Cities IX and II have median scores of 5.6 examples attempted with 65 per cent of them right and 7.4 examples attempted with 73 per cent of them right, respectively. Cities I, V and VII each have a median score of more than 12 examples attempted with more than 80 per cent of them right.

In the case of an ability so fundamental to the solving of practical problems as the ability to multiply one integer by another, there is no reason why there should be as great differences as are shown between these two groups of cities. If it is best that the pupils in cities I, V and VII attain a median score of more than 12 examples with an accuracy of more than 80 per cent, then the education of the pupils in cities II and IX is not being wisely planned. More emphasis should be placed

upon multiplication in these cities and a higher degree of ability should be attained. On the other hand, if the ability to multiply which was exhibited by the pupils in cities II and IX is all that is needed for the activities of school and the ordinary activities outside of school, then cities I, V and VII are spending some of the time of their pupils unwisely. They are placing too much emphasis upon multiplication.

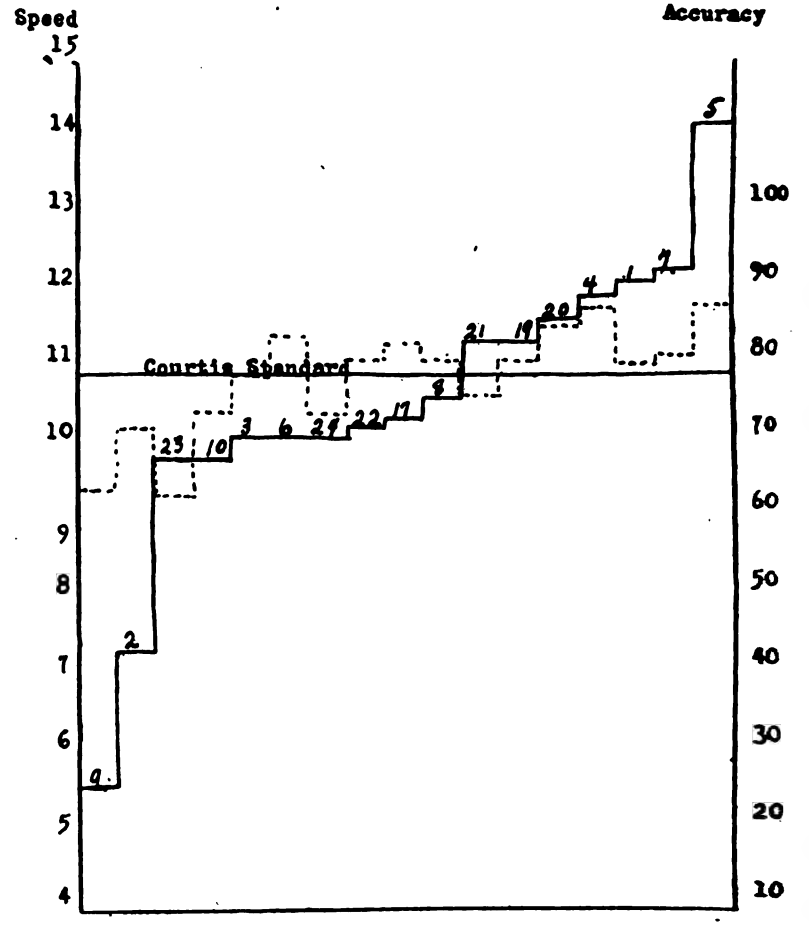

FIGURE II. Eighth-grade city medians for seventeen cities, May, 1915. Multiplication. Solid line, speed. Broken line, accuracy.

PROPOSED STANDARDS.

It is possible that neither group of cities represents the best practice. Before we can determine what is the best degree of ability to be attained by pupils by the end of their eighth grade, we must consider the demand for this ability outside of school and in further school work, and the capacity of children to attain the ability. Mr. S. A. Courtis, the author of the Standard Research Tests, has studied extensively these factors, and as a result of his studies he has set standards as shown in table LXII.

TABLE LXII. Standard individual May scores in number of samples attempted (speed).

GRADE.	Test 1, addition.	Test 2, subtraction.	Test 3, multiplication.	Test 4, division.
4	5	6	5	4
5	7	8	7	6
6	9	10	9	8
7	11	11	10	10
8	12	12	11	11

Standard accuracy for all grades, 100 per cent.

TABLE LXIII. Kansas median scores, May, 1915. Speed (number of examples attempted). Accuracy (per cent of examples done correctly).

GRADE.	Addition.		Subtraction.		Multiplication.		Division.	
	Speed.	Accuracy.	Speed.	Accuracy.	Speed.	Accuracy.	Speed.	Accuracy.
IV	5.8	51	6.4	64	5.2	58	3.8	56
V	6.0	52	6.7	63	5.8	57	4.0	53
VI	8.1	65	9.1	81	8.1	77	6.5	84
VII	8.7	67	10.0	83	9.0	78	9.3	87
VIII	9.8	71	11.5	86	10.9	82	10.1	92

The median scores for Kansas based upon tests given in May, 1915, are given in table LXIII. A comparison of the two tables shows that the standards set by Mr. Courtis are not attained by 50 per cent of Kansas children, except in the fourth grade, and the question naturally arises whether Mr. Courtis' standards are too high. The fact that his standard for the number of examples attempted was equaled or exceeded by some cities shows that they are possible of being attained un-

der ordinary school conditions. On the other hand, the fact that his standard of accuracy (100 per cent) is attained only in a very few instances, indicate that either more time must be given to the fundamental operations of arithmetic or more effective methods of teaching these operations must be devised if even half of the pupils are to attain 100 per cent accuracy.

The most appropriate standards can be determined only by continued experimentation and investigation. For the present we must use as standards both the median scores obtained by giving the tests to large numbers of children and the standard proposed by Mr. Courtis, but in the using of them it is well to remember that possibly neither are the "best" standards. The writer is of the opinion that in the case of accuracy the "best" standard is between Mr. Courtis' 100 per cent and the accuracy medians for Kansas.

SHOULD ALL PUPILS BE EXPECTED TO ATTAIN THE STANDARD?

The standards which we have considered above are "group" standards, and the standing of a group is determined by comparing the median of the group with the standard. Tables II to LXI show that the pupils of a group are distributed rather widely on both sides of the median, and the question arises, What shall be the standard for the individual pupil?

We know that any group of children exhibits rather wide individual differences, and it seems probable that when 100 eighth-grade pupils are given the test in addition, we should expect a considerable range of ability. Just how great a range on each side of the median there should be has not been determined. It is probable that improved methods and devices of instruction designed to give appropriate assistance to each pupil will materially reduce the present range of distribution. One such device, the Courtis Standard Practice Tests, is being used extensively. In any case of a pupil who is below the standard, it will be an entirely safe procedure to diagnose the cause of his low score and prescribe special drills to remedy the defect. Pupils whose scores are distinctly above standard should be excused from further drill upon the operations and allowed to spend their time more wisely in doing other things.

CHAPTER III.

The Interpretation of City Distributions and Medians.

It is not the purpose of this chapter to give a complete interpretation of the city distributions and medians given in tables II to LXI, but rather to indicate how the superintendent of one of these cities or of another city might use the facts contained in these tables in interpreting the scores made by the pupils in his city. In interpreting wisely the distributions and medians of a city it is necessary to consider not only the facts contained in these tables, but also any unusual local condition which might explain the reason for either exceptionally high or exceptionally low scores. But even if a wide variation from the consensus of practice can be explained in this way, it does not necessarily follow that it should continue to exist. It is more probable that the conclusion should be reached that because unusual local conditions exist, there is special need for methods and devices of instruction which are adapted to these conditions. It is true that even wide variations from the consensus of practice can be explained, but one should be very cautious in concluding that they are justified.

COMPARISON OF CITY MEDIANS.

For convenience the city medians have been collected and are given in tables LXIV to LXVIII. A graphical representation of these medians, such as is given in figures II, III, IV and V, assists in comparing the medians of the several cities. In these figures we have represented the medians of the eighth grade, May scores. The solid lines represent the median number of examples attempted, or the median speed, and are to be read from the scale on the left. The broken lines represent the median accuracy and are to be read from the scale at the right. The numbers just above the solid lines are the numbers assigned the cities, and the position of the horizontal portion of the solid line under a number represents the median speed of that city. The position of the horizontal broken line above the number represents the median accuracy of the same city.

It is well to compare the city medians of a number of cities, since it shows the general relative standing of the cities, but

this should be supplemented by a comparison of the distributions. Because the median is a very brief summary of the scores, the details have been omitted.

The medians of any city may be studied with reference to the progress in ability from grade to grade. For example, take the mid-year medians of city X, which are given in table LXIX. There is little growth in ability to add from grade to grade until the eighth grade is reached. So far as is shown by the medians, there is more increase in ability to add from the

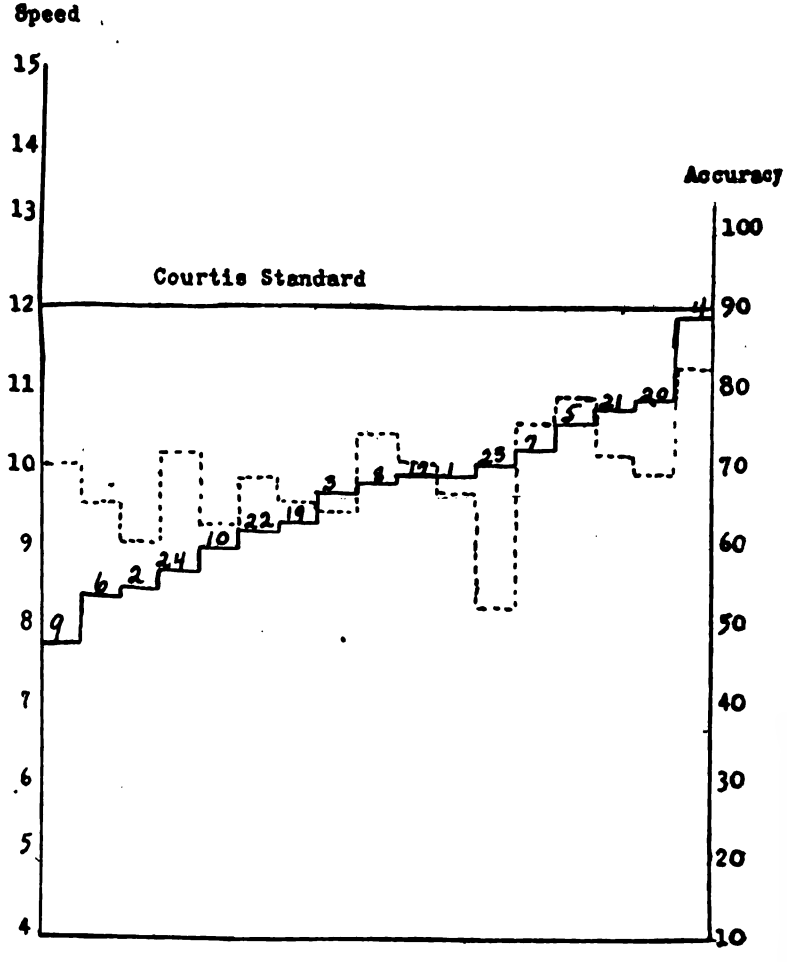

FIGURE III. Eighth-grade city medians for seventeen cities May 1915. Addition. Solid line, speed. Broken line, accuracy.

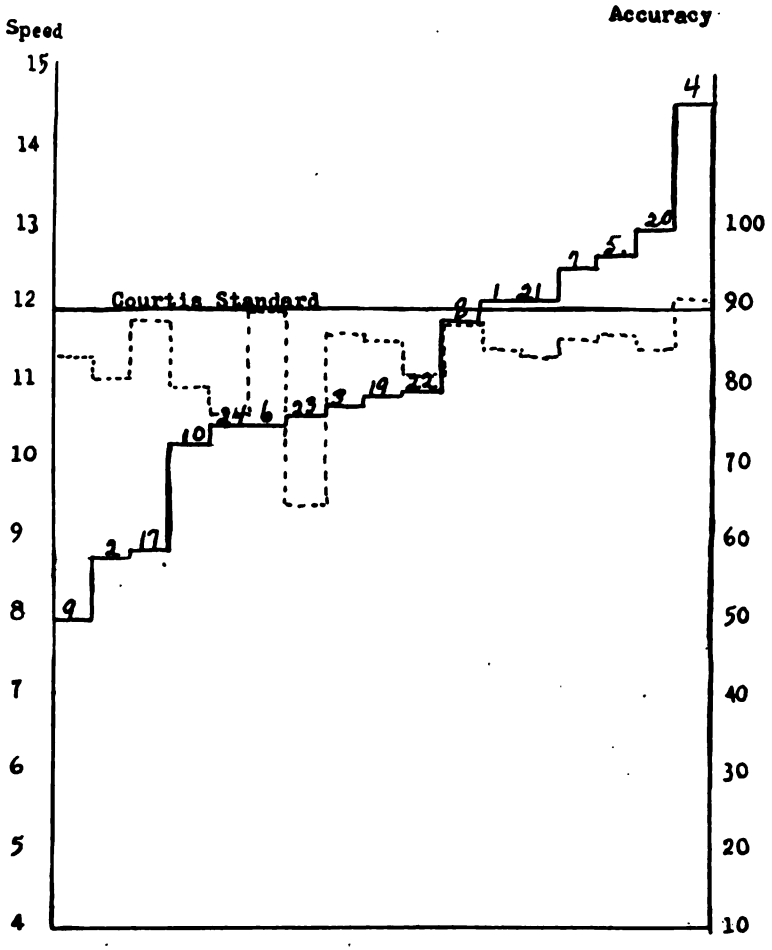

FIGURE IV. Eighth-grade city medians for seventeen cities May 1915. Subtraction. Solid line, speed. Broken line, accuracy.

eventh grade to the eighth grade than from the fourth grade o the seventh. If we were agreed that a median speed of 7.9 nd a median accuracy of 61 per cent are satisfactory stan- ards in addition for the eighth grade, there is still question hether it is wise to wait until the pupil reaches the eighth rade to attain this standard. In solving the practical prob- ems of arithmetic, the pupil has many additions to do, and it ould be economy of time for him to be able to add more rap- lly and accurately in the lower grades.

The tests are constructed so that a pupil should make about the same score on each of the tests. Since this is true, it is worth while to compare the medians of one grade for one test with the medians for another test. It sometimes happens that a class is up to standard in one or more of the operations and materially below in others. For example, in table LXIX we find the sixth-grade pupils add and subtract better than they multiply and divide.

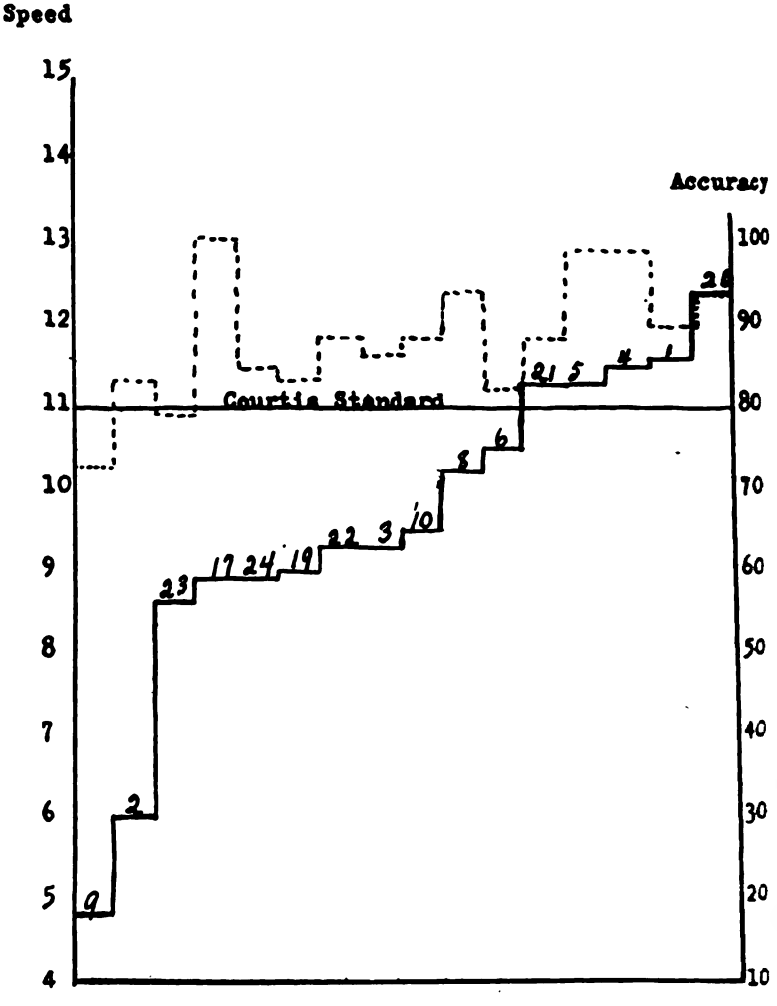

FIGURE V. Eighth-grade city medians for seventeen cities May 1915. Division. Solid line, speed. Broken line, accuracy.

TABLE LXIV. City medians, mid-year scores, January, 1915.

FOURTH GRADE.

CITY.	SPEED.				ACCURACY.			
	A.	S.	M.	D.	A.	S.	M.	D.
I	4.7	4.9	3.9	3.1	31	39	33	35
II	4.5	4.0	1.1	.....	33	31	26	.....
III	5.5	5.7	4.9	3.4	42	56	42	36
IV	4.6	5.1	4.5	3.1	30	34	30	31
V	4.7	5.7	5.0	3.9	44	64	60	54
VI	4.6	4.6	4.0	2.0	55	68	25	35
VII	4.9	5.2	3.8	2.4	38	57	35	40
VIII	4.9	5.6	4.8	3.3	44	51	39	35
IX	3.6	3.4	2.4	.....	31	36	100	
X	4.7	4.5	3.9	.....	40	42	45	.....
XI	5.3	5.8	4.3	3.5	44	40	36	36
XII	4.4	5.4	4.3	3.4	40	56	46	42
XIII	4.7	5.2	3.9	1.9	34	43	43	40
XIV	6.7	9.3	7.3	4.6	61	82	84	100
XV	6.2	6.3	5.0	4.0	70	65	57	42
XVI	4.3	4.7	4.0	2.0	31	50	45	38
XVII	7.5	7.3	6.4	4.9	55	68	65	63
XVIII	5.2	4.2	3.6	.....	44	41	44	.....
XXI	5.0	5.7	4.8	3.4	48	55	48	60
Kansas median	4.8	5.3	4.4	3.3	41	46	41	39

FIFTH GRADE.

I	5.8	6.7	5.2	3.5	46	56	53	41
II	4.6	5.8	3.8	3.5	34	60	38	45
III	6.1	7.4	7.5	4.8	60	69	67	53
IV	7.0	7.3	6.4	4.7	49	58	57	52
V	5.9	7.4	6.6	5.0	63	80	71	75
VI	5.0	5.8	4.5	2.9	39	42	42	58
VII	6.0	7.2	6.6	3.3	63	70	63	47
IX	4.3	3.7	2.7	2.3	39	53	37	28
VIII	6.0	6.8	5.8	3.9	52	62	59	49
X	5.4	5.8	4.9	3.7	47	54	49	48
XI	5.9	6.6	5.1	3.6	44	58	40	40
XII	5.4	6.5	4.8	3.1	53	66	53	59
XIII	5.9	6.6	6.2	4.1	44	59	51	44
XIV	8.5	8.9	7.3	4.6	80	82	84	100
XV	6.7	6.6	7.0	5.1	63	60	55	63
XVI	6.5	7.0	6.4	4.5	63	85	63	76
XVII	8.4	8.5	7.9	6.2	76	79	78	80
XVIII	6.0	6.0	4.9	3.6	51	54	44	48
XXI	7.8	8.2	7.0	4.9	42	63	53	58
Kansas median	5.9	6.8	6.2	4.0	52	63	57	52

TABLE LXV. City medians, mid-year scores, January, 1915.

SIXTH GRADE.

CITY.	SPEED.				ACCURACY.			
	A.	S.	M.	D.	A.	S.	M.	D.
I	7.1	8.5	7.6	6.6	55	69	68	67
II	5.7	6.2	5.0	3.1	41	62	48	63
III	6.3	7.5	6.0	4.2	53	66	63	70
IV	8.3	8.7	7.8	5.6	64	79	68	69
V	6.8	8.3	8.7	6.9	65	83	78	86
VI	6.1	7.2	6.3	4.1	53	68	64	59
VII	7.2	8.0	7.6	5.3	65	80	81	82
VIII	7.2	7.8	7.3	5.1	57	67	66	67
X	6.2	6.9	5.4	4.5	55	62	63	62
XI	7.1	6.7	7.2	5.0	81	80	83	82
XII	6.5	8.0	6.9	5.1	59	72	72	64
XIII	6.8	7.9	6.9	4.9	53	73	61	60
XIV	8.0	9.3	10.3	6.7	58	77	67	75
XV	7.2	9.0	7.5	6.0	58	82	84	76
XVI	6.6	8.0	7.5	5.5	62	70	80	70
XVII	9.1	9.9	9.4	7.7	63	78	73	86
XVIII	7.5	8.0	6.7	4.9	62	78	77	79
XXI	7.0	8.4	6.8	6.4	54	70	70	80
Kansas median	7.0	7.9	7.2	5.8	59	72	69	71

SEVENTH GRADE.

I	7.8	9.5	9.2	8.0	45	67	67	77
II	6.2	7.2	5.5	4.0	53	66	63	54
III	8.0	7.8	8.3	6.1	62	78	78	82
IV	7.8	10.0	8.6	7.6	68	79	75	86
V	8.5	10.5	10.0	8.1	66	82	81	85
VI	7.2	8.2	7.0	5.9	69	83	80	85
VII	9.1	10.4	10.0	6.5	64	73	74	86
VIII	7.9	9.3	8.8	7.0	59	78	76	80
X	6.4	7.5	6.8	5.8	48	68	63	65
XI	8.7	9.1	9.0	7.9	80	84	84	96
XII	7.7	9.7	8.3	6.8	60	82	71	82
XIII	6.6	8.7	7.6	5.7	59	82	75	76
XIV	10.5	11.5	14.0	10.0	70	80	75	83
XV	8.9	10.0	8.0	8.4	59	66	75	87
XVI	7.0	10.3	8.8	6.0	84	90	83	100
XVII	9.2	9.8	9.1	7.5	67	77	71	86
XVIII	7.9	8.6	7.5	5.7	58	76	72	81
Kansas median	7.8	9.2	8.5	7.9	63	77	74	81

TABLE LXVI. City medians, mid-year scores, January, 1915.

EIGHTH GRADE.

CITY.	SPEED.				ACCURACY.			
	A.	S.	M.	D.	A.	S.	M.	D.
I	9.5	12.1	11.2	9.9	56	78	65	83
II	6.4	7.6	6.8	4.8	50	68	57	70
III	8.9	9.6	10.0	8.0	60	72	64	76
IV	8.8	10.9	11.6	8.8	67	84	79	88
V	9.3	11.6	10.9	10.2	74	84	82	92
VI	7.0	9.0	9.3	8.2	63	82	86	84
VII	7.8	9.7	9.0	6.8	70	80	82	88
VIII	8.9	10.9	10.7	8.9	65	82	81	86
IX	7.0	8.0	7.0	6.0	55	81	65	77
X	7.9	8.8	7.3	6.3	61	74	65	75
XI	9.3	9.5	9.8	9.2	82	86	88	100
XII	7.7	10.6	9.4	7.3	60	76	79	91
XIII	8.4	12.3	10.4	9.4	58	37	37	86
XIV	10.7	11.3	11.4	8.8	77	73	78	80
XV	9.7	11.3	10.3	8.0	57	83	80	95
XVI	7.8	10.3	11.3	9.7	55	90	90	100
XVII	10.1	11.5	10.0	8.7	71	86	80	86
XVIII	7.9	9.7	8.8	9.2	68	84	82	94
XXI	9.8	11.8	11.0	10.0	70	80	81	89
Kansas median	8.7	10.5	10.9	8.6	65	80	77	86

MAY SCORES, 1915—FOURTH GRADE.

I	5.7	9.6	4.4	3.1	47	66	57	53
II	4.7	4.4	2.8	2.0	51	50	36	31
III	6.4	7.4	6.2	4.3	56	71	58	52
IV	5.7	6.5	5.3	4.0	55	67	59	56
V	6.5	8.2	6.7	5.4	61	85	80	85
VI	6.0	7.0	3.2	2.6	44	63	35	60
VII	5.8	6.0	4.4	3.4	54	66	55	65
VIII	5.6	6.2	5.0	3.6	53	63	57	50
IX	5.0	3.3	3.0	.....	30	38	38	.....
X	5.4	6.7	5.7	4.2	45	63	59	61
XVII	7.9	8.1	6.5	4.8	64	83	77	73
XIX	5.8	6.2	5.1	3.3	56	67	57	52
XX	6.3	6.8	6.0	5.2	40	59	53	59
XXI	5.3	5.9	4.6	3.0	60	77	69	100
XXII	4.3	5.0	2.6	2.6	35	45	35	41
XXIV	5.4	5.7	5.0	4.2	51	54	59	49
Kansas median	5.8	6.4	5.2	3.8	51	64	58	56

TABLE LXVII. City medians, May scores, 1915.

FIFTH GRADE.

CITY.	SPEED.				ACCURACY.			
	A.	S.	M.	D.	A.	S.	M.	D.
I	6.7	7.1	6.1	4.3	53	76	64	65
II	6.0	6.4	6.0	4.7	61	67	56	75
III	6.5	8.0	6.8	5.8	64	81	68	80
IV	8.2	9.0	7.3	6.0	63	77	73	79
V	7.7	8.6	8.0	6.8	73	88	84	86
VI	5.0	6.0	6.0	4.0	60	83	60	55
VII	6.3	6.4	7.5	4.0	63	65	67	63
VIII	7.0	7.7	6.5	4.6	61	76	69	66
IX	4.5	4.8	2.5	2.0	50	50	70	38
X	6.3	6.9	6.2	4.3	58	66	65	56
XVII	8.9	9.3	8.8	7.5	78	86	81	79
XIX	6.2	6.7	6.8	3.5	61	83	64	58
XX	7.3	8.5	7.1	5.6	48	68	63	64
XXI	8.5	8.6	6.8	5.0	60	80	67	68
XXII	6.6	6.9	5.3	3.7	74	74	62	48
XXIII	7.3	9.0	6.2	4.8	39	47	39	47
XXIV	6.5	6.6	6.6	5.1	69	67	82	69
Kansas median	6.0	6.7	5.8	4.0	52	63	57	53

SIXTH GRADE..

I	7.7	9.3	7.9	6.9	61	84	80	86
II	5.3	7.6	6.5	5.6	68	75	66	84
III	7.0	.....	7.8	5.0	66	80	66	75
IV	9.0	10.3	9.3	8.1	78	89	85	93
V	8.9	10.7	10.6	8.6	77	92	84	99
VI	6.8	8.0	6.8	4.9	58	83	85	100
VII	8.5	8.9	8.6	8.0	82	88	85	89
VIII	8.0	9.1	7.8	6.3	65	61	77	83
IX	5.2	5.2	3.7	3.2	39	53	60	35
X	7.0	8.3	6.9	6.2	58	69	68	77
XVII	11.0	11.9	10.3	9.1	68	84	73	93
XIX	7.0	8.5	7.0	6.0	67	76	79	84
XX	9.3	10.5	9.6	7.9	60	77	74	85
XXI	6.8	8.3	6.7	6.3	61	75	62	73
XXII	9.3	7.1	6.4	4.0	58	56	55	53
XXIII	8.4	9.3	8.0	4.8	54	68	61	66
XXIV	7.4	8.2	7.6	5.9	61	77	85	83
Kansas median	8.1	9.1	8.1	6.5	65	81	77	84

TABLE LXVIII. City medians, May scores, 1915.

SEVENTH GRADE.

CITY.	SPEED.				ACCURACY.			
	A.	S.	M.	D.	A.	S.	M.	D.
I	8.0	10.8	10.0	9.8	55	81	78	88
II	6.7	7.7	7.5	4.9	65	76	80	84
III	7.6	8.7	10.8	8.4	76	87	83	96
IV	10.7	11.4	9.6	10.2	70	86	81	83
V	9.9	11.6	10.8	10.0	76	87	83	96
VI	9.6	9.6	10.0	7.8	68	88	85	100
VII	9.3	12.0	11.0	10.0	78	87	81	93
VIII	8.5	10.5	9.0	8.2	71	84	78	86
IX	6.5	6.3	5.2	3.6	50	63	53	60
X	7.4	9.1	8.6	7.4	67	67	71	83
XVII	9.8	11.0	9.4	8.0	69	84	73	98
XIX	7.8	10.0	10.3	8.3	60	82	83	88
XX	9.4	11.4	10.5	9.8	60	80	82	89
XXI	7.8	9.8	7.6	6.5	53	72	65	80
XXII	6.9	9.0	7.9	7.4	60	79	78	78
XXIII	8.0	8.8	7.8	6.4	53	73	66	75
XXIV	8.3	10.1	9.9	7.9	61	69	72	85
Kansas median	8.7	10.0	9.0	9.3	67	83	78	87

EIGHTH GRADE.

I	9.8	12.1	12.2	11.6	66	85	81	90
II	8.4	8.8	7.4	6.0	60	81	73	83
III	9.6	10.7	10.2	9.3	64	87	80	86
IV	11.8	14.6	12.0	11.5	82	91	88	99
V	10.5	12.7	14.2	11.3	78	87	88	99
VI	8.3	10.5	10.2	10.5	65	90	85	82
VII	10.2	12.5	12.3	.....	75	86	82	.....
VIII	9.7	11.8	10.7	10.2	74	88	82	94
IX	7.7	8.0	5.6	4.8	70	84	65	72
X	8.9	10.3	9.9	9.5	62	80	75	88
XVII	9.8	10.9	10.4	8.9	70	88	84	100
XIX	9.2	10.8	11.4	9.0	65	86	82	83
XX	10.8	13.0	11.7	12.4	68	85	86	94
XXI	10.7	12.1	11.4	11.3	71	84	77	88
XXII	9.1	10.9	10.3	9.3	68	82	82	88
XXIII	10.0	10.6	9.9	8.6	51	65	64	79
XXIV	8.6	10.5	10.2	8.9	71	76	75	85
Kansas median	9.8	11.5	10.9	10.1	71	86	82	92

TABLE LXIX. Mid-year city medians of city X. Speed (number of examples attempted). Accuracy (per cent of examples done correctly).

GRADE.	Addition.		Subtraction.		Multiplication.		Division.	
	Speed.	Accuracy.	Speed.	Accuracy.	Speed.	Accuracy.	Speed.	Accuracy.
IV	4.7	40	4.5	42	3.9	45	.....	.....
V	5.4	47	5.8	54	4.9	49	3.7	48
VI	6.2	55	6.9	62	5.4	63	4.5	62
VII	6.4	48	7.5	68	6.8	63	5.8	65
VIII	7.9	61	8.8	74	7.3	65	6.3	75

CITY DISTRIBUTIONS.

A common characteristic of the city distributions (see tables II to LXI) is the variability of the scores. Take, for example, eighth grade on the multiplication test. Cities I, IV, V and XII have approximately the same number of pupils in this grade. Their distributions exhibit these characteristics:

City.	Minimum score.	Maximum score.	Range.	Median score.
I	6	19	13	11.2
VI	2	23	21	11.6
V	4	21	17	10.4
XII	2	21	19	9.4

Each of the distributions contains a few scores which are extremely low and a few extremely high ones. If we omit these which are evidently not characteristic of the groups and which include less than 10 per cent of the total, we have these facts:

City.	Minimum score.	Maximum score.	Range.	Median score.
I	6	14	8	11.2
IV	5	19	14	11.6
V	7	17	10	10.9
XII	4	17	13	9.4

City I and city IV have approximately the same median score, but the range of distribution of the scores about this median is very much greater in city IV than in city I. Because of this fact the results of teaching multiplication of integers in city I are superior to those obtained in city IV. This difference is doubtless due to the use of methods and devices of instruction in city I which are better adapted to the needs of the pupils than those used in city IV.

Another reason for reducing the range of variation of the scores becomes apparent when we consider the distributions of the scores of the successive grades in a city. The speed distributions of city V for both the mid-year and May scores have been assembled in tables LXX to LXXIII. The speed distributions for the addition test are represented graphically in figure VI. In the figure the solid lines represent the mid-year scores and the broken lines the May scores. In any grade there are pupils who are below the median score of the grade below, and also pupils who have scores higher than the median score of the grade above. If we compare the distribution of the fourth grade with that of the eighth, we find pupils in the fourth who have scores higher than the median score of the eighth grade, and pupils in the eighth grade whose scores are below the median score for the fourth grade.

The median scores show a very creditable growth in ability from January to May, but in most cases the range of the scores has been increased. This suggests that the instruction upon these fundamental operations was not equally appropriate for all pupils. Some pupils acquired abilities far in excess of the standard for their grade, while others remain conspicuously below the standard. Obviously, if our standards are wisely determined, the pupils who are below standard in ability need instruction and those who are conspicuously above standard may spend their time more wisely upon other subject matter. If this is not feasible, the methods and devices of instruction should be those most appropriate to those pupils who are below standard. Such a study of the city distributions as suggested above will reveal, in a general way, whether the methods and devices of instruction are appropriate for all of the pupils.

TABLE LXX. City distributions. City V. Speed. Addition. Mid-year scores (J). May scores (M).

GRADE.		0	1	2	3	4	5	6	7	8	9	10'	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Median.
IV	J.	....	4.4	8.3	18.9	26.1	19.4	15.6	2.8	3.3	.6	.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4.7
	M.	....	.6	2.3	5.8	16.2	16.2	19.7	11.6	13.9	8.1	2.3	1.7	1.2	....	....	....	....	.6	....	....	....	....	....	....	....	6.5
V	J.	....	....	1.6	6.5	23.4	21.2	21.7	13.0	5.4	1.6	3.3	1.1	....	5.	.5	....	....	....	....	....	....	....	....	....	....	5.9
	M.	....	....	....	3.3	7.7	8.7	19.7	15.3	20.8	8.2	5.5	5.5	1.6	1.6	1.6	....	.6	....	....	....	....	....	....	....	....	7.7
VI	J.	....	....	.6	1.8	9.3	19.2	25.6	14.0	13.4	10.5	2.3	1.2	2.3	....	....	....	....	....	....	....	....	....	....	....	....	6.8
	M.	....	....	....	....	2.4	6.6	12.9	14.5	15.1	13.3	10.3	10.3	6.0	2.4	1.8	2.4	.6	....	1.2	....	....	....	....	....	.6	8.9
VII	J.	....	....	....	.7	3.5	10.6	12.0	14.1	17.6	16.9	7.8	8.5	4.2	.7	1.4	.7	....	....	....	....	....	.7	....	....	.7	8.5
	M.	....	....	....	....	.7	2.1	7.5	8.9	11.6	23.2	9.5	13.6	9.5	4.8	3.4	2.1	1.4	....	4.8	....	....	....	....	....	1.4	9.9
VIII	J.	....	....	....	....	2.0	4.0	4.0	12.1	22.0	22.4	16.0	9.0	4.0	4.3	....	2.0	.9	....	.9	....	....	....	....	....	....	9.3
	M.	....	....	....	....	....	2.6	3.4	8.5	11.9	13.6	18.7	16.1	10.2	5.1	3.4	2.6	2.6	1.7	....	....	....	....	....	....	....	10.5

TABLE LXXI. City distributions. City V. Speed. Subtraction. Mid-year scores (J). May scores (M).

GRADE.		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Median.
IV	J.	....	1.1	6.5	11.4	16.8	19.5	17.8	10.3	8.1	3.8	3.8	.5	....	....	....	.5	....	....	....	....	....	....	....	....	....	5.7
	M.	.6	1.7	1.2	6.4	10.4	10.4	8.7	9.3	11.6	12.1	9.8	6.4	2.9	1.7	1.2	2.9	.6	1.7	.6	....	....	....	....	....	....	8.2
V	J.	....	....	.5	3.3	8.7	10.4	17.9	23.4	20.7	3.2	1.6	3.3	1.6	....	.5	....	....	....	....	....	....	....	....	....	....	7.4
	M.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
VI	J.	....	....	....	.6	1.7	8.7	8.7	19.7	15.6	14.5	13.9	9.3	1.2	4.1	2.3	....	....	....	....	....	....	....	....	....	....	8.3
	M.	....	....	....	.6	....	1.2	1.8	7.8	12.7	14.5	16.9	11.5	9.6	7.8	3.6	3.0	2.4	3.6	1.8	.6	....	....	....	....	.6	10.7
VII	J.	....	....	....	.7	....	2.1	5.5	9.6	13.0	11.7	15.8	13.7	11.7	5.5	4.8	2.1	1.4	.7	....	.7	....	....	....	.7	.7	10.5
	M.	....	....	....	.7	.7	1.4	4.1	4.8	10.9	8.2	12.9	12.3	7.5	11.6	8.2	6.1	3.4	1.4	2.1	1.4	....	.7	....	.7	1.4	11.1
VIII	J.	....	....	....	....	.9	....	....	9.4	13.0	8.0	19.0	12.0	16.3	8.0	5.2	2.0	3.0	2.0	2.0	....	2.0	....	....	....	....	11.1
	M.	....	....	....	....	....	....	.9	3.4	6.8	6.0	16.1	11.1	8.5	11.9	6.8	6.8	7.7	4.3	1.7	.9	3.4	....	2.0	.9	1.7	12.7

TABLE LXXII. City distributions. City V. Speed. Multiplication. Mid-year scores (J). May scores (M).

GRADE.		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Median.
IV	J.	2.7	15.8	12.5	18.5	16.9	20.1	8.2	3.3	.9	1.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	5.0
	M.	1.8	4.2	7.7	8.9	6.6	10.1	16.1	14.9	11.3	11.3	2.4	.6	2.4	.6	....	.6	....	.6	....	....	....	....	....	....	....	6.7
V	J.	....	....	.5	5.0	9.1	22.0	23.1	17.7	7.0	9.1	4.3	2.2	....	....	....	....	....	....	....	....	....	....	....	....	....	6.6
	M.	....	....	.6	1.1	3.9	11.2	15.7	18.0	10.7	20.8	9.0	4.5	1.1	2.3	....	1.1	....	....	....	....	....	....	....	....	....	8.0
VI	J.	....	....	....	.6	1.2	4.1	13.4	18.0	18.6	10.5	18.4	5.8	5.2	2.9	3.5	2.3	....	....	.6	....	....	....	....	....	....	8.7
	M.	....	....	....	.7	1.3	2.6	10.9	6.4	10.3	10.9	11.6	13.5	7.1	9.6	1.9	5.8	1.9	1.3	1.3	.7	1.3	1.3	....	....	....	10.6
VII	J.	....	....	....	....	1.3	3.9	9.2	4.6	14.4	17.0	15.0	12.4	5.9	7.2	6.6	.7	.7	....	....	....	....	....	....	....	1.3	10.0
	M.	....	....	....	1.4	....	2.1	4.2	9.1	7.0	14.0	15.4	9.8	10.5	7.7	8.4	4.9	2.8	2.1	....	.7	....	....	....	....	1.4	10.8
VIII	J.	....	....	....	....	.9	....	3.0	6.1	4.4	16.0	24.0	9.0	11.3	5.3	7.0	2.0	7.0	4.4	....	....	.9	.9	....	....	....	10.9
	M.	....	....	....	....	....	....	2.5	4.1	2.5	5.8	9.9	9.9	4.9	8.2	10.7	4.9	7.4	3.8	9.0	3.3	2.5	2.5	3.3	.9	1.7	14.2

TABLE LXXIII. City distributions. City V. Speed. Division. Mid-year scores (J). May scores (M).

GRADE.		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Median.
IV	J.	....	17.3	20.0	21.1	18.4	19.5	5.4	2.2	1.6	....	....	.9	....	....	....	....	....	....	....	....	....	....	....	....	....	3.9
	M.	3.6	7.7	9.5	12.5	10.1	16.7	12.5	7.2	7.7	1.8	3.0	2.4	1.8	1.8	.6	....	....	.6	....	....	.6	....	....	....	....	5.4
V	J.	....	4.9	8.7	18.9	17.3	13.0	13.0	8.1	7.6	3.8	3.2	1.1	.5	....	....	....	....	....	....	....	....	....	....	....	....	5.0
	M.	....	.6	3.4	5.7	18.3	12.0	13.7	9.1	14.3	10.3	4.0	4.0	3.4	1.1	....	....	....	....	....	....	....	....	....	....	....	6.8
VI	J.	....	.6	1.7	5.8	11.0	22.6	9.8	8.1	16.2	3.5	6.9	1.7	3.5	5.2	2.3	....	1.2	....	....	....	....	....	....	....	....	6.9
	M.	.7	....	....	3.2	7.1	8.3	9.6	13.5	12.8	9.6	10.3	3.9	3.9	5.8	3.9	2.6	1.9	.7	1.3	....	....	.7	....	.7	....	8.1
VII	J.	....	....	.7	2.6	7.9	13.1	15.0	9.8	17.7	9.2	5.9	3.9	9.2	2.6	.7	....	.7	....	....	....	....	....	....	....	1.3	8.1
	M.	....	....	.7	.7	2.1	4.2	7.6	10.4	15.9	9.0	13.8	6.2	9.0	6.9	2.8	4.8	....	.7	.7	....	....	....	....	....	1.4	10.0
VIII	J.	....	....	....	.9	....	6.4	9.1	7.3	11.0	14.0	11.0	6.4	18.2	9.1	.9	5.0	2.0	....	....	....	....	....	....	....	....	10.2
	M.	....	....	....	....	3.3	3.3	2.5	9.9	14.8	7.4	5.8	9.9	13.1	9.0	3.3	5.8	2.5	1.7	1.7	3.3	1.7	1.7	....	....	....	11.3

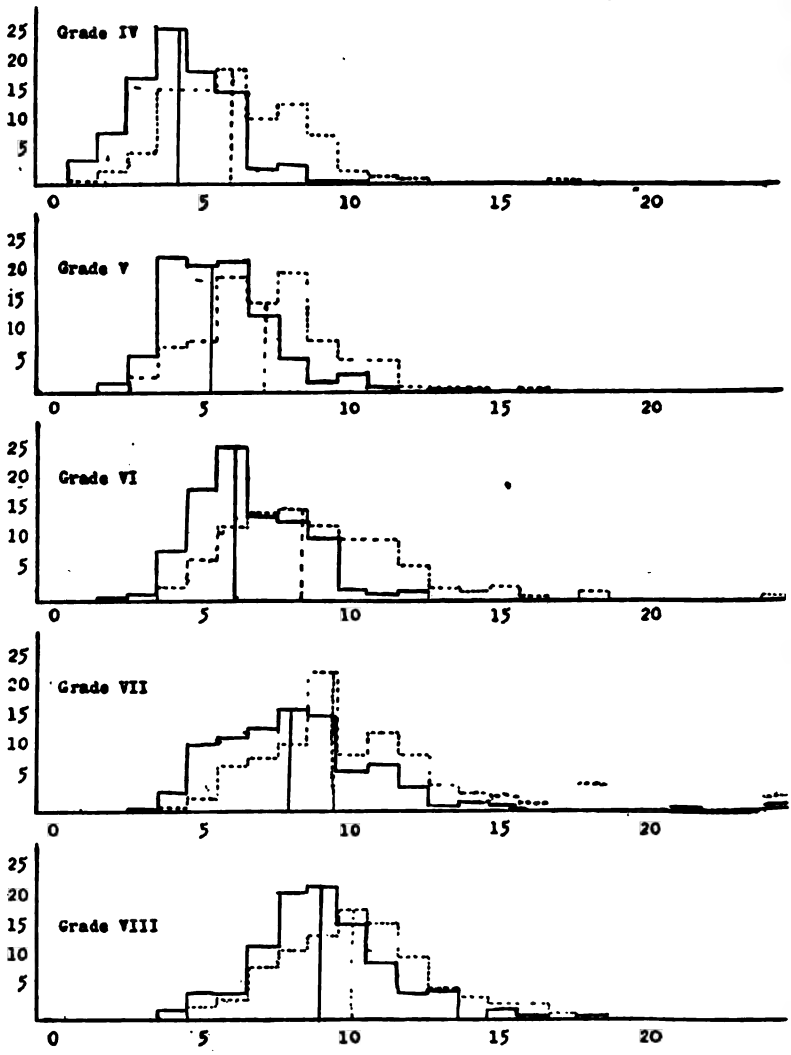

FIGURE VI. City distributions for speed. Addition, city V. Solid line, mid-year scores. Broken line, May scores.

CHAPTER IV.

The Use of Individual Scores.

The giving of the Standard Research Tests in Arithmetic or any similar tests is worth while only to the extent that the scores are used as a basis for planning changes which will increase the efficiency of the school. The scores when studied properly will reveal the points of strength and the points of weakness. The scores which are above standard reveal those cases in which the desired results have been achieved or exceeded by the methods and devices of instruction which are now in use. However, it may be that in attaining these results, the time and effort of the pupils and the teacher were not used most economically or most wisely. Only continued experimentation and measurements can determine this question. The scores which are below standard reveal those cases in which the desired results have not been achieved by the methods and devices of instruction now being used. For these pupils more efficient instruction must be devised. The efficiency of changed methods and devices of instruction can be determined by repeating the tests at the end of the school year or at the beginning of the following school year.

In chapter III some methods of studying the medians and distributions were given, but these two classes of facts can reveal only general conditions and should be used only as a basis for determining large changes. A study of them should be supplemented by a study of the individual scores of pupils. Particularly should this be done when the meaning of the medians and distributions is indefinite. It is the purpose of this chapter to indicate some of the ways in which the individual scores may be used.

INDIVIDUAL SCORES.

Table LXXIV gives some typical scores of fifth-grade pupils. The scores reveal the weakness of the individual pupils. For example, pupil IV adds and mulitplies well, but is low in subtraction in both speed and accuracy. Pupil V works rapidly enough, but is lacking in accuracy. Pupil XI is good in subtraction, but is poor in the other operations, and so on. Some pupils are below standard in one operation, others in another

TABLE LXXIV. Some typical scores of fifth-grade pupils.

Pupil.	Addition.		Subtraction.		Multiplication.		Division.	
	Attempts.	Rights.	Attempts.	Rights.	Attempts.	Rights.	Attempts.	Rights.
I	6	2	7	1	5	2	2	1
II	5	4	4	2	3	1	4	0
III	8	5	7	6	5	3	5	1
IV	9	8	6	2	11	8	.....	.....
V	6	1	13	0	4	0	4	1
VI	8	4	11	8	8	5	4	0
VII	9	3	10	4	5	2	5	3
VIII	10	7	6	5	5	4	5	3
IX	8	4	6	2	7	4	2	0
X	5	0	8	6	6	0	5	2
XI	4	1	7	7	6	4	5	2
XII	5	2	8	3	5	1	6	4
XIII	5	1	6	4	5	4	7	5
XIV	4	2	6	5	5	3	3	3

operation. Some are below standard in speed, others in accuracy, and still others in both speed and accuracy. An average class presents a very complex situation, but for correcting the gross weaknesses the pupils can be classified in a few groups and appropriate special instruction planned for each of the groups. In addition to this group instruction, a few cases will probably require individual attention. In any case, it certainly is true that the remedial instruction can be most intelligently planned when the individual scores are considered.

DETERMINING THE EFFECTIVENESS OF INSTRUCTION.

When the tests are repeated as they were in a number of the cities included in this report, the second scores are valuable for determining the effectiveness of the methods and devices of instruction which have been tried. A comparison of the two sets of scores reveals what changes have been produced in the pupils. A convenient form of tabulations for showing the relation between a pupil's first score and the second one is shown in table LXXV. The table is read thus: 13 pupils had a mid-year score of 4 examples attempted. Two of these pupils showed no gain, 4 gained one example, 4 gained two examples, 1 gained three examples, 1 gained four examples,

and 1 gained five examples. The average gain of the group was 1.8 examples. It is evident that the instruction was not equally effective with all the pupils of this group and the average gain of the groups with low mid-year scores is not very much greater than of groups with the higher mid-year scores.

TABLE LXXV. The gain in number of examples attempted compared with the mid-year score. Addition.

MID-YEAR SCORE.	Gain.										Total.	Average gain.
	—3	—2	—1	0	1	2	3	4	5	6		
1	....	....	....	....	....	....	....	....	....	....	.....	.....
2	....	1	....	....	....	....	2	....	....	....	3	1.3
3	....	....	....	1	1	2	1	1	....	....	6	2.0
4	....	....	....	2	4	4	1	1	1	....	13	1.8
5	....	....	....	5	3	3	3	1	....	....	15	1.5
6	....	....	1	4	1	7	2	3	....	....	18	1.8
7	....	....	3	3	6	5	1	1	....	....	19	1.1
8	....	1	2	4	7	1	1	....	....	....	16	.5
9	....	....	....	2	1	1	2	....	....	....	6	1.5
10	....	1	1	....	1	3	....	....	....	....	6	.7
11	....	....	....	....	....	....	....	1	....	....	1	4.0
12	....	....	1	....	....	....	....	....	....	....	1	—1.0
13	1	....	....	....	....	....	....	....	....	....	1	—3.0
14	....	....	1	....	....	....	1	....	....	....	2	1.0
15	....	....	....	....	....	....	....	....	....	....	.....	.....
16	....	....	....	1	....	....	....	....	....	....	1	0
Total	1	3	9	22	24	26	14	8	1	....	108	1.3

RELATION BETWEEN SPEED AND ACCURACY.

The individual scores may also be used to determine whether the pupils who work most rapidly also have a large per cent of their examples correct or whether one quality is being sacrificed to gain the other. The form of tabulation is that of the class record sheet. See Figure I, page 9. In general it has been found that the pupils who work most rapidly have the largest per cent of their examples correct, but among the class record sheets which were sent to the Bureau of Educational Measurements and Standards a few cases were found where the attainment of a high speed had been accompanied by a very low degree of accuracy.

RELATION BETWEEN GAIN IN SPEED AND GAIN IN ACCURACY.

When the tests are given a second time the gain in speed and the gain in per cent of examples done correctly can be calculated and these two items tabulated as in table LXXVI. This table shows the relation between the gain in speed, or number of examples attempted, and the gain in accuracy, or the per cent of examples done correctly. In this particular tabulation there are few pupils who show a loss in both speed and accuracy. A small group gained in speed and lost in accuracy but there is a large group which gained in both speed and accuracy. This tabulation includes all of the sixth-grade pupils of city V. It may be that the losses in accuracy all occur in one or two buildings, or it may be that they are uniformly distributed over the city. However, it appears that some methods and devices of instruction are being used which are not most appropriate for certain pupils.

TABLE LXXVI. Relation of increase in speed to increase in per cent of accuracy.

GAIN IN SPEED.

	GAIN IN ACCURACY.	—5	—4	—3	—2	—1	0	1	2	3	4	5	6	7	8	9	10	11	12	Total
Positive.	86–90									1										1
	81–85																			
	76–80							1												1
	71–75									1										1
	66–70									1										1
	61–65					1														1
	56–60						1				1									2
	51–55							1				1								2
	46–50						1	1	1											3
	41–45						2	1												3
	36–40					1	2	2		2	1		1							9
	31–35						1	1		1	2									5
	26–30					1		1	1	3	3									9
	21–25					1	2	1	2	3		1								10
	16–20					1	3	1	6	3		2								16
	11–15						1	4	2	2	2	1	2		1					15
	6–10					3		3	2	2	1	2	1	1						14
	1– 5							5												5
	0						1				1									2
Negative.	1– 5												1	1						2
	6–10			1				1	2		1	1								6
	11–15							3	1			2								6
	16–20					2		2	4	2	1	1	2							14
	21–25									2	1									3
	26–30								1											1
	31–35						1		2								1			4
	36–40								1			1								2
	41–45							1												1
	46–50					1		1												2
	51–55																			
	56–60																			
	61–65								1											1
	66–70																			
	71–75							1												1

Other Publications by the Bureau of Educational Measurements and Standards.

No. 1. Report of a survey of the Leavenworth Public Schools, Leavenworth, Kan.

No. 2. The Cost of Instruction in Kansas High Schools, by Walter S. Monroe.

No. 3. The Kansas Silent Reading Tests, by F. J. Kelly.

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VOL. V. NEW SERIES. No. 7.

KANSAS STATE NORMAL SCHOOL

EMPORIA

A Teacher's Handbook on Educational Measurements, Reading, Writing, and Arithmetic.

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Professor of School Administration, and Director of the Bureau of Educational Measurements and Standards, Kansas State Normal School.

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INTRODUCTORY STATEMENT.

In preparing this Handbook on Educational Measurements it has been the purpose of the Bureau of Educational Measurements and Standards to place in the hands of teachers a body of useful information concerning educational tests, how to use them, and particularly how to make the most use of the results obtained. How well we have accomplished this purpose can be determined only by those who attempt to use the handbook. The authors invite criticism and suggestions for improvement.

The chapter on reading was prepared by Dean Kelly, and the chapter on handwriting by Professor DeVoss. The director of the Bureau of Educational Measurements and Standards is responsible for the chapter on arithmetic and the general plan of the book. Acknowledgement is made to other workers in this field. Particular mention should be made of S. A. Courtis, who kindly permitted the use of certain portions of his directions.

The manuscript for this handbook was originally prepared early in the fall of 1916. Afterwards it appeared wise to make the material generally accessible in book form. Accordingly it was rewritten and enlarged by the addition of chapters dealing with tests for other school subjects. This book is now being published with the title "Educational Tests and Measurements," by Houghton Mifflin Company.

Unexpected difficulties prevented the publication of this bulletin in time for distribution during the school year of 1916-'17 and in publishing it at this time the manuscript has been revised. Those who desire a more extensive treatment of other school subjects are referred to the text mentioned above.

WALTER S. MONROE,
Director, Bureau of Educational Measurements and Standards.
July 25, 1917.

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CHAPTER I.

ARITHMETIC.

Because of their extensive use in Kansas as well as other states, the consideration of arithmetic is based upon the Courtis Standard Research Tests, Series B. The general directions for the use of this test and most of the suggestions which are made for the use of scores may be applied to other tests.

THE COURTIS STANDARD RESEARCH TESTS.[1]

The Standard Research Tests, Series B, or, as they are commonly called, the Courtis Arithmetic Tests, consist of a set of four tests, one test for each of the four fundamental operations of arithmetic. The addition test consists of twenty-four examples of the following type:

939	392	757	939	389	482	779	809
274	287	594	376	975	857	554	667
475	935	138	567	682	449	323	372
867	849	666	631	448	604	997	735
354	726	683	327	361	773	468	531
492	614	575	988	596	598	821	198
366	248	157	459	653	326	156	832
939	192	505	726	437	432	664	901
729	407	199	412	164	557	179	427

It will be noticed that each of these examples calls for the same number of additions under approximately the same conditions. This makes the examples approximately equal in difficulty; that is, any example, say the seventh, is just as difficult as any other, say the second. Thus the tests may be considered to consist of twenty-four equal units, just as a yardstick consists of thirty-six equal units (inches).

The ability of a pupil to do addition examples of this type is measured by having him work at these examples for exactly eight minutes, and the measure of his ability is represented by the distance he has advanced along the scale, *i. e.*, by the number of examples done and by the per cent of these examples which have been done correctly.

Each of the other three tests consists of twenty-four examples, the examples of each test being approximately equal in difficulty. These tests are given in a similar manner, a definite time being allowed for each. It should be noted that although each test consists of only one type of example, this type has been chosen so that it involves most of the difficulties which are met in performing the operation. Take, for example, the addition test. Besides a knowledge of the fundamental facts, addition involves column addition, bridging the tens, carrying, and span of attention. The examples of the addition test are constructed so that all of these abilities are demanded.

1. Copies of these tests can be obtained from the Bureau of Educational Measurements and Standards, Emporia, Kansas.

DIRECTIONS FOR USING THE COURTIS STANDARD RESEARCH TESTS IN ARITHMETIC, SERIES B.[2]

The Courtis Standard Research Tests in Arithmetic measure the ability of pupils to perform the fundamental operations with integers, and by so doing they measure the effectiveness of the instruction which the pupils have received.

Instructions to Examiners.

1. For each room prepare as many bundles of papers as there are rows of seats, putting into each bundle as many papers as there are seats in each row.

2. Begin by saying, "My purpose this morning is to measure how well this school teaches its children how to add, subtract, multiply, and divide. I have here some printed tests. They are not examinations, because exactly these same tests are given to all the grades from the fourth through high school. They are also being given in other schools in this city and in other cities all over the country. It is the school that is being examined to-day. If you treat the tests as though they were a game you will enjoy them and do your best for the honor of your school. I am going to give each of you a set of these papers, but do not look at them until I tell you to do so. Will the boys and girls in the front seats please distribute them for me?"

3. Distribute the papers by putting a bundle on the first desk in each row and letting the children do the rest.

4. Have the children fill out the blanks at the bottom of the first page.

5. Have the children read instructions for test 1 out loud in concert.

6. "Now, please listen closely. In these tests it is important that we all start at the same time and stop at the same time. We can do this easily if you follow my instructions exactly. Lay your paper on your desks face down, keeping it between your thumb and finger, like this (illustrate), so that you can turn it over quickly when I tell you to start. Take your pencils in your right hand, and when I say 'Get ready' raise your pencil hand in the air as if you were going to ask a question. (Illustrate, by suiting the action to the words.) Then when I say 'Start' you can bring your pencil down as you turn the paper over, and every one will start at the same time. When I say 'Stop' I want you all to stop at once, and to raise your hands again so that I can see that you have stopped. Now I think we are ready to try the test."

When the second hand of the watch reaches the 55 second mark, say "Get ready for the addition test. Hands up." Exactly at the 60 mark say "Start."

Allow Exactly Eight Minutes.

"Stop. Hands up." Make sure all have stopped. "Count how many examples you have finished, and write the number in the score card in the corner under the number attempted. Do not count examples you have begun but have not finished. Your score is the number of examples you have finished. I am coming to your desk to see that you have written it in the right place."

7. Read the answers from an answer card (be sure the form number corresponds with that of the tests), and have children check answers right or wrong, counting the number right and writing it in their score cards.

---

2. These directions are adapted from those prepared by Mr. Courtis and reproduced here by his permission.

8. In similar fashion give and score the other tests:
   For test 2, subtraction, allow exactly *four* minutes.
   For test 3, multiplication, allow exactly *six* minutes.
   For test 4, division, allow exactly *eight* minutes.

9. Give tests 1 and 2 the first day and tests 3 and 4 the next. All may be given at one time if desired.

10. The teacher should rescore all papers having exceptionally low or high scores. Mark I. N. F. (instructions not followed) all papers where the children have used the wrong operation (addition for multiplication, etc.).

Tabulating the Scores.

11. Record the scores on the class record sheet according to the directions which are given on that sheet. These directions are given below.

12. Compute the class medians according to the directions on page 9 or in folder D.

13. The class medians should be interpreted by comparison with the standard median scores, or by comparison with medians from other cities. Directions for doing this are given on page 11.

14. Interpret the individual scores and distributions as directed on pages 16–21.

15. The conditions revealed by giving the tests should be remedied by modifying the instruction which the pupils receive. Directions for doing this are given on page 21 and following.

Tabulating the Scores of a Class.

The measures obtained by giving the tests provide information concerning the individual pupils, but it is also important to know the measure of the class or group as a whole. In describing the scores made by the members of a class, considered as a group, it is convenient to do it by telling how many pupils attempted one example, how many attempted two examples, etc. Such a statement of the number of examples attempted by the members of a class is called the "distribution of the scores according to the number of examples attempted," or, more simply, the "distribution according to speed." If the per cent of examples done correctly has been computed, a similar distribution of these scores can be made according to the per cent of examples done correctly, or accurately.

In tabulating the scores a class record sheet of the form shown in FIG. I is used. The large figures at the top of the sheet refer to the number of examples attempted and the small figures within the squares refer to the number of examples done correctly. The sheet is arranged so that the per cent of examples done correctly is computed automatically, and the distribution of the scores according to both speed and accuracy is obtained at the same time.

To record the scores of a class, proceed as follows:[3] "For each test

3. These directions and the directions for computing class medians are reproduced by permission of Mr. Courtis.

FIGURE I.—The class record sheet for tabulating the scores of individual pupils according to both speed and accuracy. The scores tabulated on this sheet were made by a 7-B class on the multiplication test.

SCORE IN NUMBER OF EXAMPLES ATTEMPTED.

SCORE.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
Per cent	—	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
100							2		1					1	1	1										6
90											9 2	10 2	11	12	13	14	15	16	17	18	18–19	19–20	20–21	21–22	22–23	4
80						4	5	6	7 2	8 1	8 4	9 3	10 2	11	12	12–13	13–14	14–15	15–16	16–17	16–17	17–18	18–19	19–20	20–21		12
70					3			5 1	6	7 1	7 1	8 1	9	10 1	10–11	11	12	12–13	13–14	14–15	14–15	15–16	16–17	17–18	17–19		5
60			2		3	4		5 1	6	6	7	8 1	8–9 3	8–9	9–10	10–11	11	11–12	12–13	12–13	13–14	14–15	14–16	15–16		5
50		1		2		3 1	4 1	4 1	5 1	5	6	6–7	7	7	8	8–9	9–10 1	9–10	10–11	10–11	11–12	11–13	12–13	12–14		5
0 to 49	0	0	0	0–1	0–1	0–2	0–2	0–3	0–3	0–4 1	0–4 1	0–5	0–5	0–6	0–6	0–7	0–7	0–8	0–8	0–9	0–9	0–10	0–10	0–11	0–11	2
Total							3	3	5	4	8	6	3	5	1	1		1								39

Accuracy.

Figures in small type indicate scores in number of examples right.

separately, sort the papers from one class on the basis of the scores in number of examples attempted. (For instance, put into one pile all those papers having a score of 12 examples attempted, into another pile all the 10's, into another all the 9's, and so on.) Then, one pile at a time, resort the papers in each of these piles on the basis of their scores in number of examples right. (For instance, if there were six papers each having a score of 12 examples attempted, these would be sorted into piles of 12 right, 11 right, and so on.) Next, count the number of papers in each of these piles and record the numbers in the proper vertical column of the table. (That is, if there was one paper with a score of 12 attempted and 12 right, two papers with a score of 12 attempted and 11 right, and three papers with a score of 12 attempted and 9 right, a figure 1 would be written in the column headed 12, and in the division containing the small figure 12; a figure 2 in the division containing 11, and 3 in the division containing 9. When all the scores have been entered, find the sum of the figures in each vertical column and in each horizontal row. If the work has been accurately done, the sum of the horizontal totals will just equal the sum of the vertical totals."

In FIG. I the distribution according to speed is found at the bottom of the record sheet and is to be read thus: Three pupils attempted only 6 examples, two pupils attempted only 7 examples, five pupils attempted only 8 examples, etc. The distribution according to accuracy is found at the right-hand side of the sheet and is to be read thus: The per cent of examples done correctly by two pupils was less than 50 per cent, for five pupils it was between 50 per cent and 60 per cent, for five other pupils it was between 60 per cent and 70 per cent, etc. These two distributions, the one according to the per cent of examples done correctly and the other according to the number of the examples attempted, describe the ability of the pupils of this class to do the examples of the multiplication test.

CLASS MEDIANS.

The ability of a class may be more briefly described by a statement of the central tendency of these distributions. Two central tendencies are in general use, the average and the median. The average is probably the better known and is simply the arithmetical mean. The median is a mid-measure. It is a score such that there are half of the scores above it and half below it. The median of the speed distribution in Fig. I is within the ten-example interval. There are eight scores of ten examples attempted, and if we consider them uniformly distributed over this interval, two of the eight will be counted with the scores above the median and five with those below the median. This makes nineteen scores above the median and nineteen scores below the median. The position on the scale of the remaining score is the median. The numerical value of this score is found according to the following directions:

INSTRUCTIONS FOR COMPUTING APPROXIMATE MEDIANS.

A median is defined as the mid-measure, the measure such that there are just as many scores larger as there are smaller.

The steps in finding the median are:

A. Find half the sum of the frequencies.

If there are 37 children in the class, the 19th score in order of magnitude would be the median score; for there would be eighteen scores larger and

eighteen smaller. If there were 36 children in the class, the 18th score would be taken as representing the nearest approximation to the middle measure.

B. Begin at the lower end of a distribution and add the frequencies in order until the addition of the next frequency would make the sum greater than the half-sum obtained in (A). Record the sum to this point in very fine figures just after the last frequency added. The median score is evidently in the group of scores whose addition would make the sum too large. Note the score opposite this group and record it.

C. Occasionally the sum of the frequencies to a certain point will yield a number exactly equal to the half sum obtained in (A.) In this case the approximate median is still the score opposite the *frequency whose addition would make the sum too large; that is, the next higher score.*

ILLUSTRATION:

The median speed is 12 examples: for

A. The half-sum is 36 (72+2).

B. The sum of the frequencies less than the half-sum is 35 (3+3+2+14+6+7=35). 35+9 would be larger than 36. Therefore the 36th score, or median, falls in the group of nine scores of 12 each.

In similar fashion for accuracy, 4+3+8+8=23. 23+25 would be greater than 36. Therefore the median falls in the group of 25 scores having an accuracy of from 80-89%. The approximate median accuracy is therefore, 80%.

INSTRUCTIONS FOR COMPUTING THE TRUE MEDIANS.

The medians found above are called approximate medians because 12 examples, as used above, may mean anything from exactly 12.0 examples to 12.99 examples; 80 per cent accuracy anything between 80 per cent and 89.9 per cent accuracy. As long as the speed of individuals in the class varies from six to twenty-four examples, as in the illustration, it is enough to know that the median speed is about 12 examples, but it is possible to carry the computations further. This is known as "correcting the approximate median," and the result is the "true median."

To find the correction, subtract the sum in (B), page 00, from the half-sum found in (A), and divide the remainder by the number of scores in the group in which the median falls, carrying the result to two decimal places. Write the result to the nearest tenth, under the median score, as shown in the figure. Add the correction to the approximate median to obtain the true median.

ILLUSTRATION:

Speed:

1. The half sum, 36, minus the partial sum of the frequencies, 35=1.

2. The remainder, 1, divided by 9, the number of scores in the group in which the median falls=.11. Therefore, the correction is .1 and the true median 12.1 examples.

Accuracy:

1. 36—23=13.

2. 13÷25=.51.

3. In this case one further operation is necessary, since the size of the divisions in the column headed "Score" differs by tens (60%, 70%, 80%, etc.) instead of by units (12, 13, 14, etc.). The rule is, multiply the correction by the size of one division: .51×10%=5.1%. The correction is therefore 5.1%, and the true median 85%. The true score in "rights" is 12.1×85%, or 10.2 examples.

STANDARDS FOR INTERPRETING CLASS MEDIANS.

Mr. Courtis, the author of the Standard Research Tests, Series B, proposed as standard individual scores for pupils completing the respective grades those given in Table I.

TABLE I.—Standards individual May scores in number of examples attempted (speed).

GRADE.	Test 1, Addition.	Test 2, Subtraction.	Test 3, Multiplication.	Test 4, Division.
4	5	6	5	4
5	7	8	7	6
6	9	10	9	8
7	11	11	10	10
8	12	12	11	11

Standard accuracy for all grades, 100 per cent.

These scores for number of examples attempted have been equaled or exceeded by the median scores of many groups of pupils. They were exceeded by the median scores of a few cities in Kansas in May 1915,[4] but with a very few exceptions the medians for the state of Kansas were below them.

"In Table II there are given three standard scores: (1) general median scores based upon distributions of "many thousands of individual scores in tests given in May or June, 1915-'16. The distribution for each grade was made up of approximately equal numbers of classes from large-city schools and from small-city and country schools"; (2) the standards proposed by Courtis after three years' use of these tests; (3) Boston standard median scores after the tests had been used for three years.

"With reference to the standards which he has proposed Courtis says:

"'The speeds set as standard are approximately the average speeds at which the children of the different grades have been found to work when tested at the end of the year, when for any one grade a random selection of five thousand scores from children in schools of all types and kinds are used as a basis of judgment.

"'Standard accuracy is perfect work, 100 per cent. This is a tentative standard only, as there is available very little information in regard to the factors that determine accuracy and the effects of more efficient training.

"'At present in addition and multiplication it is only very exceptional work in which the median rises above eighty per cent accuracy, while in subtraction and division the limiting level is ninety per cent.

"'Standard speeds are not likely to change greatly. Standard accuracy is surely destined to approach much more nearly one hundred per cent than present work would indicate.

"'Standard scores are not only goals to be reached; they are limits not to be exceeded. It seems as foolish to overtrain a child as it is to undertrain him. All direct drill work should, in the judgment of the writer, be discontinued once the individual has reached standard levels. If his abilities develop further through incidental training, well and good, but the superintendent who, by repeated raising of standards, forces teachers and pupils to spend each year a larger percentage of time and effort upon the mere mechanical

4. See Walter S. Monroe, A Report of the Use of the Courtis Standard Research Test in Arithmetic in Twenty-four Cities, pp. 81-85.

skills, makes as serious a mistake as the superintendent who is too lax in his standards.'[5]

"Comparisons with these standards or any others are valid only when the tests have been given under standard conditions. Slight changes in the method of giving the tests may affect the scores as much as the differences in the standards from one grade to another."[6]

TABLE II.—Standard Median Scores, Standard Research Tests, Series B.

GRADE.	Addition.		Subtraction.		Multiplication.		Division.	
	Speed.	Acc.	Speed.	Acc.	Speed.	Acc.	Speed.	Acc
IV—General	7.4	64	7.4	80	6.2	67	4.6	57
Courtis	6	100	7	100	6	100	4	100
Boston	8	70	7	80	6	60	4	60
V—General	8.6	70	9	83	7.5	75	6.1	77
Courtis	8	100	9	100	8	100	6	100
Boston	9	70	9	80	7	70	6	70
VI—General	9.8	78	10.8	85	9.1	78	8.2	87
Courtis	10	100	11	100	9	100	8	100
Boston	10	70	10	90	9	80	8	80
VII—General	10.9	75	11.6	86	10.2	80	9.6	90
Courtis	11	100	12	100	10	100	10	100
Boston	11	80	11	90	10	80	10	90
VIII—General	11.6	76	12.9	87	11.5	81	10.7	91
Courtis	12	100	13	100	11	100	11	100
Boston	12	80	12	90	11	80	11	90

Speed is the number of examples done in the time allowed.
Accuracy is the per cent of examples correct.
"General" medians were determined by Courtis on the basis of the 1916 tabulations and summaries of tabulations of other years. Courtis, S. A. Third, Fourth, and Fifth Annual Accountings, 1913-16. (Department of Cooperative Research, Detroit).
The Boston standards were established after using the tests for three years. Ballou, F. W. Arithmetic, the Courtis Standard Tests in Boston, 1912-15. (Bulletin No. 10 of the Department of Educational Investigation and Measurement.)[6]

In Table III proposed Kansas standard median scores for both speed and accuracy are given. They are slightly higher than the Kansas median scores for accuracy, May, 1915, and have been proposed only after considering the median scores of several other large groups of children.

TABLE III.—Proposed Kansas standard median scores. (Speed (number of examples attempted). Accuracy (per cent of examples done correctly).

	Addition.		Subtraction.		Multiplication.		Division.	
	Speed.	Accuracy.	Speed.	Accuracy.	Speed.	Accuracy.	Speed.	Accuracy.
IV	5.0	60	6.0	70	5.0	70	4.0	70
V	7.0	65	8.0	75	7.0	75	5.0	72
VI	8.0	74	9.0	84	8.0	84	7.0	85
VII	9.0	78	10.0	88	9.0	88	9.0	93
VIII	10.0	80	11.0	90	10.0	90	10.0	95

5. Courtis, S. A. Third, Fourth, and Fifth Annual Accounting, 1913-16 (Department of Cooperative Research, Detroit), p. 49.

6. Educational Tests and Measurements, by Walter S. Monroe (Houghton Mifflin Company).

The standard medians for both speed and accuracy given in Table III are represented graphically in Figs. II to V. The numbers along the base line refer to the number of examples attempted and the vertical scale represents the accuracy. The position of the small circles represent the standard medians for the respective grades. For example, in Fig. II the position of the small circle marked IV represents the median scores of the fourth grade for addition.

The median scores for any school or city may be located upon these diagrams in the same way that the standard medians have been. By this means a superintendent or principal will have a compact graphical representation of the median scores for his school compared with the standard scores. Since the proposed standards for accuracy are probably too low, no superintendent or teacher should be satisfied until the circles representing his school are conspicuously above the circles representing the standard medians.

In interpreting class medians or other measures of abilities the existing conditions must be kept in mind. Because of local conditions, a particular class may be composed of pupils of exceptional ability or it may be made up of pupils who for some reason can not be expected to possess standard ability. When either of these conditions is known to exist it should be taken into consideration.

If it is believed that true measures of the pupil's abilities have not been obtained the test may be repeated. Of course, this should be done without

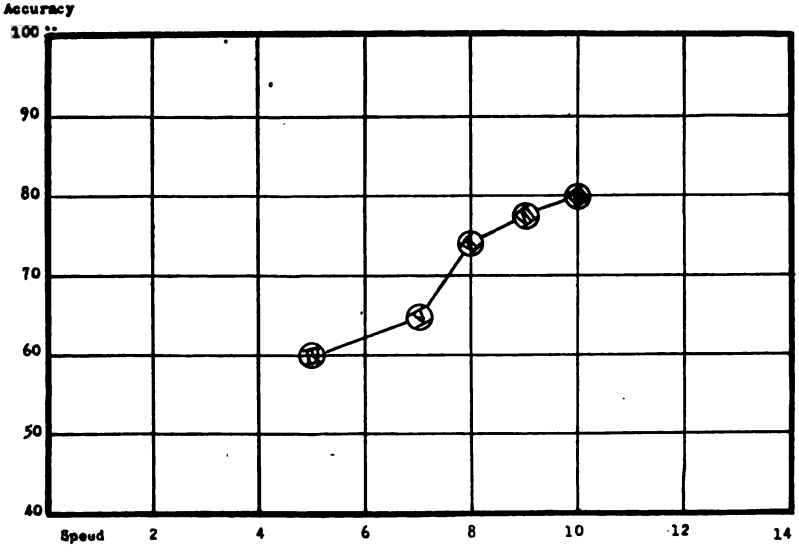

FIG. II. Standard May Medians. Addition.

special drill upon the types of examples upon which the tests are based. However, it must constantly be kept in mind that the purpose of measurement is to secure true measures. The writer has known of teachers who condemned certain tests as unsatisfactory and as possessing little or no value simply because the tests showed their pupils to be below standard in the

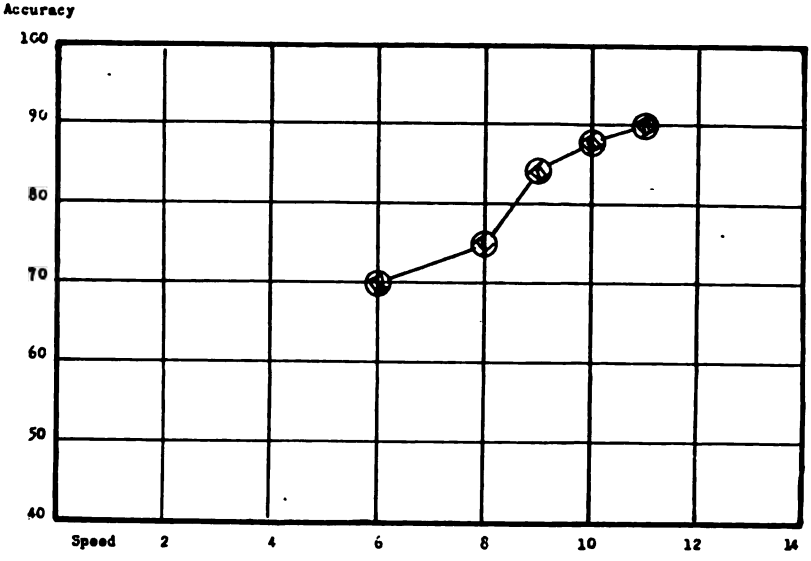

FIG. III. Standard May Medians. Subtraction.

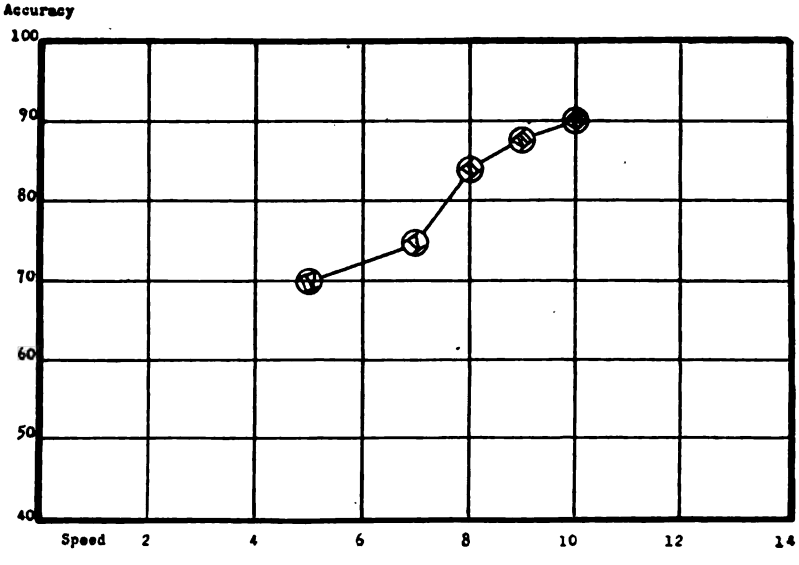

FIG. IV. Standard May Medians. Multiplication.

abilities measured. No instrument for measuring the ability of pupils can be unsatisfactory or worthless for this reason. The class medians obtained from using the Courtis Standard Research Tests, Series B, have been proved to possess a high degree of accuracy. Therefore, when the class medians differ materially from the standard medians the teacher must seek the ex-

planation for this condition in the effectiveness of her instruction or in some source other than in the tests used.

Before leaving the topic of interpretation of class medians it must be pointed out that class medians which are conspicuously above the standard

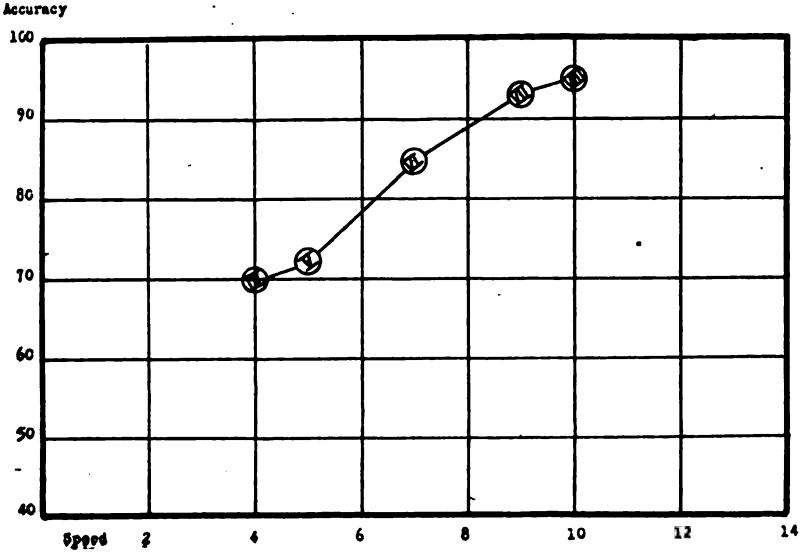

FIG. V. Standard May Medians. Division.

medians may represent unsatisfactory conditions as well as class medians which are below standard. The teacher should endeavor to have the pupils direct their efforts so that the educational outcomes possess the highest possible value. When pupils have attained the degree of ability in the fundamental operations represented by the proposed standards it is probably wise for their time and energy to be directed to other topics of arithmetic or other school subjects.

Another method of interpreting median scores is by comparison with the median scores of other cities. A convenient plan of graphical representation is that employed in Fig. VI. The solid line represents the speed medians and is read from the scale at the left. The accuracy medians are indicated by the broken line, which is read by the scale at the right. The figures refer to cities. Suppose it is desired to interpret the medians for city.[7] It is evident that in speed it stands next to the highest of these cities, and conspicuously above the Courtis Standard. In accuracy its relative standing is not so high, and ranks only about average.[7]

In interpreting median scores it is also valuable to compare the medians for one grade with those of the grades above and below. The instruction of the school should be organized so that the pupils' progress through the

7. Median scores for 1914-'15 are given in A Report of the Use of the Courtis Standard Research Tests in Twenty-four Cities, by Walter S. Monroe. Median scores for 1915-'16 are given in the Annual Report of the Bureau of Educational Measurements and Standards for 1915-'16.

several grades will be systematic. For the fundamental operations with integers this progress probably should conform to the shape of the curves in Figs. II to V. In each of these the curve rises more rapidly in grades four, five and six than in the remaining two grades. If a teacher finds, upon com-

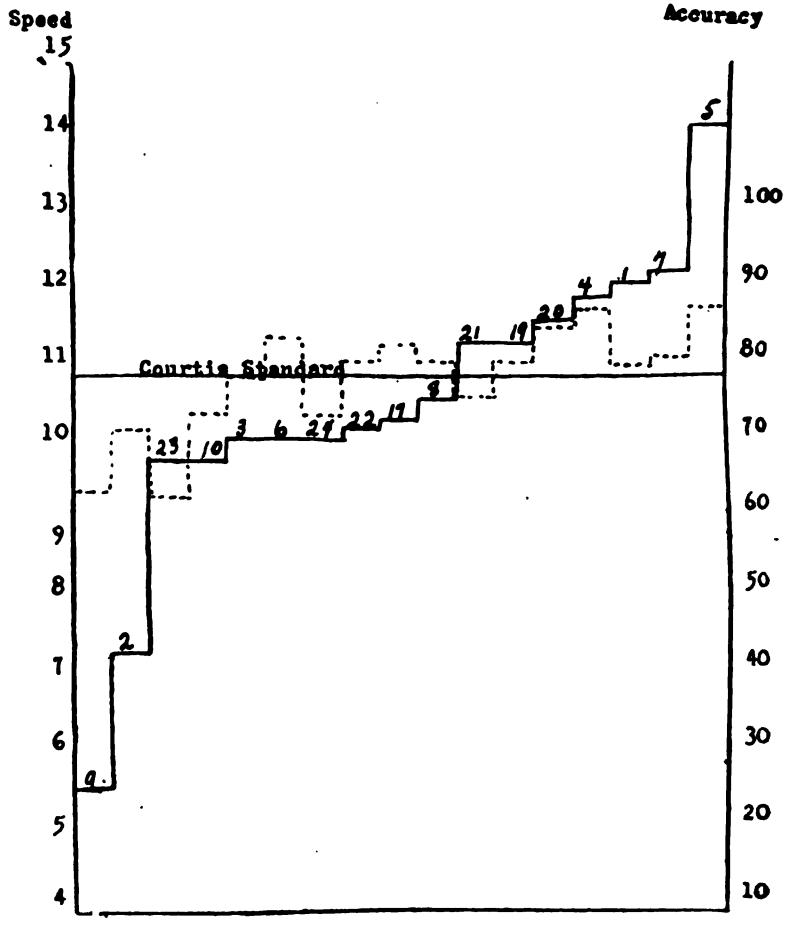

FIG. VI. Eighth-grade city medians for seventeen cities, May, 1915. Multiplication. Solid line, speed. Broken line, accuracy.

paring her class medians with those of the grades above and below, that the position of her class medians is not in the line of this plan of progress she should consider whether her instruction is conforming to the general plan for the school.

INTERPRETING CLASS DISTRIBUTIONS.

The several pupils of any class will not be found to possess the same degree of ability. In some classes we find a very great range of ability. In others the range of ability is very much less. The teacher's function is to

instruct those who have not learned, and to direct those who have learned to other topics so that they may employ their time profitably. This being true, the range of ability which exists in a class is an index of one phase of the teacher's effectiveness as an instructor.

One method of interpreting class distributions is to compare them with standard distributions. In Tables IV to VII standard distributions of scores for speed, based upon the measurement of about 10,000 pupils in May, 1915 are given. Instead of giving the distributions in detail, seven divisions or intervals have been used. The starting point is a middle division two examples in width and having the proposed standard median at the middle. On both sides of this middle division there are two divisions of one example each. The remaining scores are designated as being simply above or below the last division. The distributions are expressed in per cents rather than in terms of the actual number of scores.

Table IV is read as follows: For the fourth grade, 1 per cent of the pupils attempted fewer than two examples, 5 per cent attempted two examples, 10 per cent attempted three examples, 37 per cent attempted either four or five examples, 18 per cent attempted six examples, 12 per cent attempted seven examples, and 17 per cent attempted more than seven examples. The distributions for the other grades are read in the same way.

TABLE IV.—Distribution of individual scores: Addition—Speed.

	Number of examples attempted.												
		2	3	4	5	6	7	8	9	10	11	12	
Grade IV.....	1	5	10	37		18	12	17					
Grade V.....	5			9	15	38		15	9	9			
Grade VI.....	8				10	16	33		12	8	33		
Grade VII.....	11					12	13	33		9	7	13	
Grade VIII....	11						11	15	30		12	11	13

TABLE V.—Distribution of individual scores. Subtraction—Speed.

	Number of examples attempted.												
		3	4	5	6	7	8	9	10	11	12	13	
Grade IV.....	6	7	13	36		13	12			13			
Grade V.....	9			9	16	35		12	8	11			
Grade VI.....	8				9	12	32		18	9	17		
Grade VII.....	9					8	13	28		12	9	21	
Grade VIII....	8						11	11	28		12	7	24

TABLE VI.—Distribution of individual scores. Multiplication—Speed.

	Number of examples attempted.												
		2	3	4	5	6	7	8	9	10	11	12	
Grade IV.....	5	11	14	35		17	18	10					
Grade V.....	8			8	14	36		14	9	11			
Grade VI.	8				11	14	28		12	10	17		
Grade VIA.....	9					10	15	30		12	9	15	
Grade VIII....	10						7	10	25		13	9	26

TABLE VII.—Distribution of individual scores. Division—Speed.

	Number of examples attempted.												
		1	2	3	4	5	6	7	8	9	10	11	12
Grade IV.....	4	11	18	39		12	6	10					
Grade V.....	5		9	17	36		15	5	16				
Grade VI.....	15				14	14	25		11	7	14		
Grade VII.....	14						8	10	24		12	8	24
Grade VIII.....	20							6	13	10		7	12	24

TABLE VIII.—Showing distribution of accuracy scores.

ADDITION.

GRADE.	Per cent of examples correct.							
	100.	90.	80.	70.	60.	50.	49–0.	M.
4.....	9.1	.4	9.4	8.5	11.0	13.5	48.7	51
5.....	10.7	1.1	15.1	10.4	13.8	14.1	35.0	61
6.....	11.7	20.5	16.7	12.6	15.6	15.5	27.1	65
7.....	9.7	4.0	16.1	15.4	14.3	13.6	27.1	67
8.....	9.8	8.0	17.2	17.0	14.5	14.0	20.1	71

SUBTRACTION.

GRADE.	Per cent of examples correct.							
	100.	90.	80.	70.	60.	50.	49–0.	M.
4	16.4	1.5	15.7	9.4	11.8	10.4	34.2	64
5	20.0	3.0	2.5	12.5	12.6	11.8	19.8	75
6	28.2	7.4	21.3	14.4	11.6	9.3	13.2	81
7	19.2	12.6	24.7	16.1	11.6	8.3	7.7	83
8	22.4	18.4	24.7	12.0	10.0	6.1	7.1	86

MULTIPLICATION.

GRADE.	Per cent of examples correct.							
	100.	90.	80.	70.	60.	50.	49–0.	M.
4	16.1	4.8	11.8	7.7	11.9	11.6	40.6	58
5	17.9	1.5	17.7	11.1	13.6	13.1	25.2	69
6	19.1	4.3	22.2	14.2	14.4	10.7	15.3	77
7	14.0	4.6	22.0	15.4	13.3	12.7	17.8	78
8	17.3	15.4	24.2	17.8	11.9	8.5	7.7	82

DIVISION.

GRADE.	Per cent of examples correct.							
	100.	90.	80.	70.	60.	50.	49–0.	M.
4	24.7	5.3	6.4	5.9	8.7	10.7	43.2	56
5	25.3	1.7	12.3	8.6	10.5	11.3	30.7	68
6	34.1	4.2	19.4	9.0	10.4	7.3	15.9	84
7	35.0	8.3	20.3	10.9	10.2	6.4	9.4	87
8	37.4	15.1	21.5	8.4	7.7	3.5	6.5	92

In Table VIII the distributions of the scores for accuracy are given. The nature of the tests and the conditions governing accuracy cause certain irregularities in these distributions. The fact that 100 per cent accuracy can not be exceeded would cause the scores to be bunched in that interval. A pupil who attempts fewer than ten examples can not have an accuracy between 90 and 100 per cent. This fact will cause few scores to be found in the 90 per cent interval. The scores should be brought as near the 100 per cent interval as possible, and, other things being equal, the nearer they are the more efficient will be the instruction.

One way of comparing distributions is by means of graphical representation. In Fig. VII the solid lines represent the standard distributions for the addition test. The distributions for the addition test in a certain city in May, 1915, are represented by the broken lines. A comparison of the broken-

line curves with the solid lines, which represent the standard distributions, shows very clearly the situation in this particular city so far as the addition test is concerned. In this city a special effort had been made to provide appropriate instruction for those pupils who made the lowest scores in January. It is obvious that the teachers succeeded in most of the cases. How-

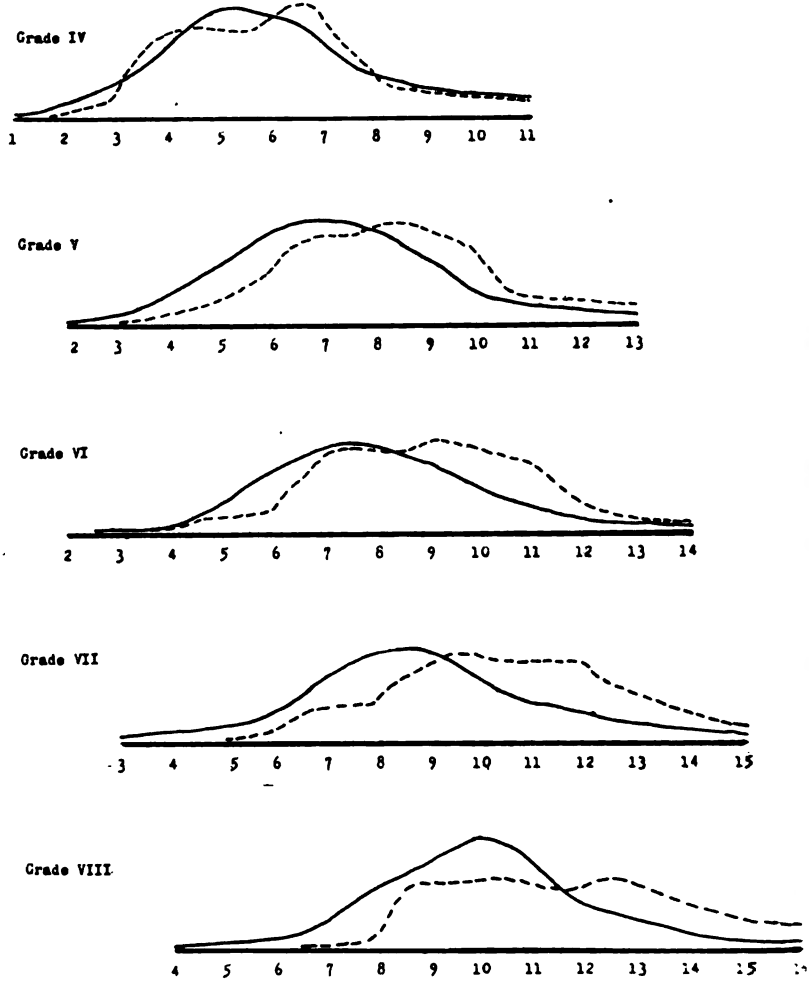

FIG. VII. Showing how the distribution of scores for a city may be compared with the standard distributions. Solid line represents standard may scores for addition, speed. Broken line represents the distributions of May scores for a city in which a special effort was made to help the pupils having low scores in January.

ever, with the exception of the fourth grade, this accomplishment has not been accompanied by a closer clustering of the scores about the median. This suggests that possibly the brighter pupils were given more drill than they needed. If this is true, the instruction was inefficient in this respect.

The bright pupils could have spent the time devoted to drill more profitably to doing other work. The total result has been that the scores cluster less closely about the median than do the scores in the standard distribution.

INTERPRETING INDIVIDUAL SCORES.

A standard median score serves as a basis for evaluating the general standing of the group. If the median score of the group is below the standard median the group as a whole is below standard. This information is worth knowing both by the teacher and by the superintendent, but such general information is adequate for the teacher. If a teacher uses the information which the tests provide to improve her instruction she needs to make a more detailed interpretation of the scores made by her pupils. If on the addition test a fifth-grade pupil's score of examples attempted is four it is not sufficient to simply know that this pupil ranks with the poorer half of a large group of fifth-grade pupils. The teacher needs to know how far down in this poorer half he stands. It makes much difference in our interpretation of his score whether two-thirds of this poorer half are below him or only one-tenth of them are below him. In the latter case he is very near the lower end of a large group of fifth-grade pupils. In the other case he has a third of the group below him. A pupil's position in the standard distributions can easily be determined by reference to Tables IV to VII for speed, and to Table VIII for accuracy.

DIAGNOSTIC MEASUREMENT.

The purpose of educational measurement is to assist in making the teacher's instructional efforts more effective. It fulfills this purpose by revealing what the teacher has accomplished and what she has yet to accomplish. The Courtis Standard Research Tests, Series B, are instruments for general measurement. The information which they yield is of a general nature. They serve to locate the pupils who are above standard and those who are not yet up to standard. They do not reveal the exact nature of the shortcomings of a pupil who is below standard. For this a more elaborate series of measurements is needed.

For the purpose of diagnosis two series of tests have been devised recently, the Woody Arithmetic Scales and the Cleveland Survey Tests. An analysis and comparison of the diagnosis secured by these two series of tests indicates the diagnosis secured by using the Woody Arithmetic Scales is faulty and unsatisfactory. The Director of the Bureau of Educational Measurements and Standards has just completed a set of Standardized Tests in Arithmetic which furnishes a very satisfactory diagnosis. Sample copies will be sent upon request. The most elaborate instrument for diagnosis is the Courtis Practice Tests which will be described in the following pages under the head of "Remedial Instruction."

REMEDIAL INSTRUCTION.

In the field of education it is necessary first to realize the character of the outcomes which it is desired to produce in the pupils. For example, in the case of arithmetic it is necessary to know whether it is a single arithmetical ability we are trying to produce in the child, or a group of specific abilities. If the latter situation is the case it is necessary to identify each of the specific abilities involved and to plan definitely for the teaching of each one.

ARITHMETICAL ABILITIES.

A few years ago Stone[8] investigated the nature of ability in arithmetic and concluded that it was made up of a number of specific abilities. His conclusions have been corroborated by a number of other investigations,[9] and it is now reasonably certain that in teaching the operations of arithmetic we are attempting to engender a number of specific abilities which are relatively distinct, and not a single arithmetical ability. In fact, it is obvious that the ability to add a column of three figures is not the same as the ability to add a column twelve figures long. In adding a column of figures it is necessary that one hold in mind the partial sum until he has added the next figure. This process must be repeated continuously until the final sum is reached, and a failure to do this continuously will result in stopping the adding at least temporarily. It is a frequent occurrence for one who is not accustomed to adding long columns of figures to find that he has stopped, perhaps has even lost the partial sum and must begin over again. The span of attention required in adding three figures is short, and pupils who are able to do examples of this type with a high degree of skill frequently are unable to add long columns of figures with an equal degree of skill. In fact, we have no reason to expect them to be able to do this type of example until they have practiced upon it.

Mr. Courtis, the author of the Standard Research Tests, has identified the following abilities in the operations with integers.

Addition: (1) Addition combinations; (2) single column addition of three figures each; (3) "bridging the tens" (38+7); (4) column addition, seven figures; (5) carrying; (6) column addition with increased attention span, thirteen figures to the column; (7) addition of numbers of different lengths.

Subtraction: (1) Subtraction combinations; (2) subtraction of 9 or less from a number of two digits, both with and without simple "borrowing"; (3) subtraction involving borrowing.

Multiplication: (1) Multiplication combinations; (2) multiplicand two digits, multiplier one digit, and no carrying; (3) same as number 2, but with carrying; (4) long multiplication without carrying; (5) zero difficulties; (6) long multiplication with carrying.

Division: (1) Division combinations; (2) simple division, no carrying; (3) same as number 2, but with carrying; (4) long division, no carrying; (5 zero difficulties without carrying; (6) long division with carrying; (7) "second case, where the trial divisor is one larger than the first figure of the dividend but the trial quotient is the true quotient"; (8) "third case, where the first figure of the divisor is the trial divisor, but the true quotient is one smaller than the trial quotient"; (9) "fourth case, where the first figure of the divisor must be increased by one to obtain a trial divisor and the second trial quotient must be increased by one to get the true quotient."

Each of these types of examples requires a specific habit or automatism. To be sure, certain elements, such as the number facts, may be considered

8. C. W. Stone, Arithmetical Abilities and Some Factors Determining Them.

9. F. W. Ballou, Determining the Achievement of Pupils in Addition of Fractions: School Document No. 5, 1916, Boston Public Schools.
Recently an investigation was made under the direction of the writer of the nature of the ability to place the decimal point in a quotient. This investigation showed that a number of specific abilities were involved and not a single ability.

common elements, but careful analysis will show that the ability to do examples of one type is different from that required to do another. Not only will a careful analysis reveal this fact, but it has been repeatedly demonstrated by carefully conducted investigations. In addition to the specific automatisms which are required for the four fundamental operations with integers, a number of other automatisms are required for the operations with fractions both common and decimal. At present we have only partial analysis of the examples in these fields, and for that reason it is not possible to state all of the types of examples that are within the range of school work.

THE LAWS OF HABIT FORMATION.

The laws governing the engendering of automatisms or specific habits have been quite definitely established. Stated in psychological terms, the first law is that in the beginning the attention of the learner shall be focalized upon the habit to be acquired. In terms of schoolroom practice this means that the learner shall understand what reaction is to be made to a given stimulus and shall then react to it in the appropriate manner. This gives the learner the right start.

The second law is that the accomplishment of the step outlined in the first law shall be followed by attentive repetitions. It is not sufficient that there be simply repetitions or drill. The drill must be attentive.

The third law states that no exceptions shall be permitted until the habit is firmly established, which means the attentive practice must be continued until the operation has become a habit; that is, has been made automatic.

INDIVIDUAL DIFFERENCES.

These are the general laws which govern the engendering of habits or automatisms, but it is a well-known fact that the individual differences of pupils become prominent in their learning. Some pupils quickly grasp the response which is to be made by seeing another perform it; others require a detailed explanation; still others progress most rapidly by being allowed to reason out the appropriate response. Some pupils are eye-minded, some are ear-minded, and still others are motor-minded. Not only do these differences appear in the first step of the learning process, but pupils also differ greatly in the amount of practice which they require to reach a given degree of facility in performing an operation.

CLASS INSTRUCTION.

Frequently the writer has visited classes in arithmetic which were being drilled upon the fundamental operations. A fairly uniform procedure was followed. The same example was dictated to all of the pupils, regardless of whether they needed drill upon this particular type of example or not. Naturally some pupils finished very quickly, and as they waited for their classmates to finish there was a tendency for them to become disorderly—a perfectly natural tendency. After a majority of the class had finished the example the teacher stopped the work of the remainder of the class and read the correct answer. The process was then repeated. The result was that a few pupils who worked slowly completed few, if any, examples during the entire period, and therefore received little satisfactory drill. The bright pupils spent a considerable proportion of the time waiting on the other

members of the class, and probably did not need the particular kind of drill which they received.

Obviously it is the pupil who performs the operation slowly and with difficulty who needs practice. The pupil who already is skillful in performing the operation does not need further drill. Our present procedure of giving this drill provides drill for the pupil who does not need it and prevents the pupil who does need it from receiving it in a satisfactory manner.

THE EFFECT OF CLASS INSTRUCTION.

The effect of such methods of teaching is clearly seen when the abilities of pupils are measured accurately. For example, cities I, IV, V and XII of those included in "A Report of the Use of the Courtis Standard Research Tests in Arithmetic in Twenty-four Cities" had approximately the same number of pupils in the eighth grade. The distributions of the number of examples attempted by the pupils of this grade in the multiplication test exhibit these characteristics:

City.	Minimum score.	Maximum score.	Range.	Median score.
I	6	19	13	11.2
IV	2	23	21	11.6
V	7	17	10	10.9
XII	4	17	13	9.4

Each of the distributions contains a few scores which are extremely low and a few extremely high ones. If we omit these which are evidently not characteristic of the groups, and which include less than 10 per cent of the total, we have these facts:

City.	Minimum score.	Maximum score.	Range.	Median score.
I	6	14	8	11.2
IV	5	19	14	11.6
V	7	17	10	10.9
XII	4	17	13	9.4

City I and city IV have approximately the same median score, but the range of distribution of the scores about this median is very much greater in city IV than in city I. Because of this fact the results of teaching multiplication of integers in city I are superior to those obtained in city IV. This difference is probably due to the use of methods and devices of instruction in City I which are better adapted to the needs of the individual pupils than those used in city IV.

Fig. VIII shows graphically the distributions of the pupils according to the number of examples attempted on the addition test for the successive grades in city V. The solid lines refer to mid-year scores and the broken lines to May scores. The medians of the distributions are indicated by vertical lines.

The medians show a very creditable growth in ability from January to May, which indicates that in general the instruction which the children of this city received was effective. All of the distributions show that great differences of ability exist in each grade. In any grade there are pupils who are below the median score of the grade below, and also pupils who have scores higher than the median score of the grade above. If we compare the distribution of the fourth grade with that of the eighth, we find pupils in the fourth who have scores higher than the median score of the eighth grade, and pupils in the eighth grade whose scores are below the median score for the

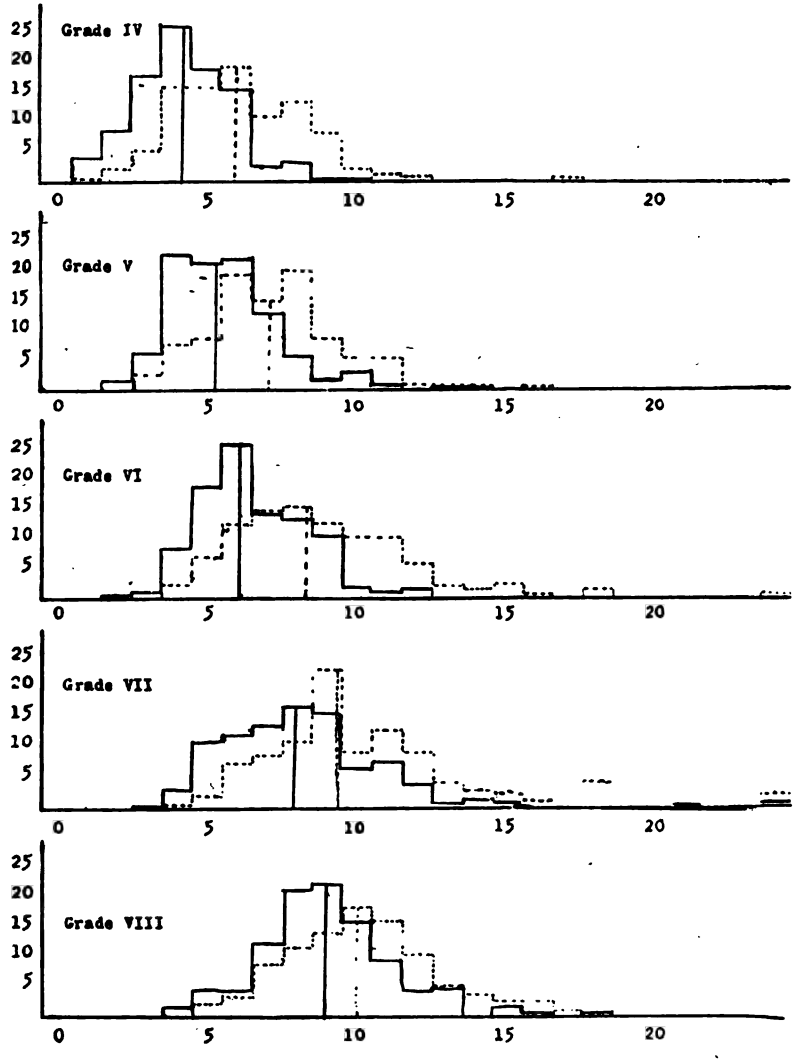

FIG. VIII. City distributions for speed. Addition, city V. Solid line, mid-year scores. Broken line, May scores.

fourth grade. On the average, 28.5 per cent of the scores of a grade are above the median for the grade above and 27.7 per cent of the scores of a grade are below the median of the grade below.

In Table IX the mid-year distributions are compared with those for May. With only two exceptions, both the total range and the range of the middle 50 per cent were increased. This fact suggests that the instruction in addition which these pupils received was more appropriate for the brighter pupils than for those who were below standard ability. Some pupils acquired abilities far in excess of the standard for their grade, while others remain conspicuously below the standard. This is merely what we should expect, because those pupils who have profited most under our system of instruction may be expected to continue to profit most. Obviously, if our standards are wisely determined, the pupils who are below standard in ability need instruction and those who are conspicuously above standard may spend their time more wisely upon other subject matter. If this is not feasible, the methods and devices of instruction should be those most appropriate to those pupils who are below standard. If the methods of instruction are unchanged it is obvious that the pupils who have learned most readily will continue to do so.

TABLE IX.—The range of number of examples attempted.
For each grade the upper line is for January and the lower line is for May.

CITY V. ADDITION.

GRADE.	Total range.	Range in number of examples.	Range of middle 50 per cent.	Range in number of examples.
IV	1–10	10	3.6– 5.9	2.3
	1–17	17	5.0– 8.3	3.3
V	2–14	13	4.7– 7.0	2 3
	3–16	14	6.8– 9.0	2 2
VI	2–12	11	5.7– 8.4	2.7
	4–24	21	7.2–11.0	3 8
VII	3–24	22	6.9–10.0	3 1
	4–24	21	8.5–12.3	3.8
VIII	4–18	15	8.1–10.8	2.7
	5–17	13	8.9–12.1	3.2

INSTRUCTION FITTED TO THE NEEDS OF PUPILS.

The measures obtained by means of the Standard Research Tests, Series B, furnish a preliminary diagnosis of the situation with which the teacher has to deal. She learns what pupils are up to or above standard in each of the operations. By referring to Tables IV to VII a teacher can tell at once just where each pupil stands in the standard distributions. In the case of the pupils who are below standard the diagnosis must be carried further in order to ascertain just what types of examples each pupil is unable to do with standard ability. After the difficulty is located, instruction suited to the

needs of each pupil can be prescribed upon the basis of the knowledge of the pupil's difficulty and of the laws governing the engendering of habits. The pupils who are above standard need little or no formal instruction upon the operations with integers and should have their efforts directed to other topics.

THE COURTIS STANDARD PRACTICE TESTS.

Based upon these principles, Mr. Courtis has devised a series of Standard Practice Tests.[10] These tests consist of forty-eight sets of exercises, each set being limited to a single type of example. In this way there is provided special training for each of the abilities recognized in this series of tests. As their name implies, the tests were devised as a means of providing systematic drill, but they are also instruments for measuring separately the forty-eight arithmetical abilities.

The latest form of these tests (1916) is arranged so that the pupils begin the series by taking lesson 13, a test involving all types of examples found in the first twelve lessons. All pupils who attain standard ability on this test are excused from the first twelve lessons, because they have demonstrated that they do not need the instruction which these lessons provide. After those who did not attain standard ability on lesson 13 have finished the first 12 lessons, they take lesson 13 again to show that they now are up to standard. Lessons 30, 31 and 44 are also test lessons and are used in the same way.

Each of the lessons is printed upon a card and a copy is furnished to each pupil. The card is placed beneath a sheet of transparent paper and the example is read through the paper, the work being done on the paper. The lessons have been constructed so that the standard length of time required to complete each one is the same. They are also self-scoring. These two features relieve the teacher of the laborious work of scoring the papers and makes it possible for different pupils to be working upon different lessons. Thus, when a pupils has demonstrated that he is up to standard on any type of example he may at once go on to the next lesson. If he is not up to standard on any lesson his work makes the fact obvious, and he can remain upon that lesson until he acquires the necessary ability without interfering in the least with the work of the other members of the class.

Table X offers proof that the tests provide for individual progress without destroying the group formation. It represents random samplings of student's records of 20,000 children, showing number and per cent of children completing the various groups of lessons during sixteen weeks' use. The table should be read as follows: Of 1154 students' records tabulated, 93, or 8 per cent, show progress through from 27 to 29 lessons; 123, or 11 per cent, had finished 23 to 26 lessons only, etc.

TABLE X.—Showing the different rates at which children may progress when using the Courtis Practice Tests.

Lessons..	1–4	5–7	8–11	12–15	16–19	20–22	23–26	27–29	Total.
Number..	55	86	198	269	,177	153	123	93	1,154
Per cent..	5	8	17	23	15	13	11	8	100

10. Full details regarding these tests may be obtained from the publishers, World Book Company, Chicago, Ill.

As suggested above, under this plan children who attain standard scores upon a type of example are excused from further drill upon examples of this type. This feature makes possible the saving of considerable time by allowing the pupils who have met the requirements to spend their time upon other work. In an unpublished report, Mr. Courtis makes the following statement: "The per cent of time saved is found by dividing the total number of lessons for each child so excused by the product of the number of children in the class and the number of days on which the practice tests were used. For instance, if in a class of 40 children the practice tests were used 80 days, the total time given to the practice tests would be 3200 lessons. If 8 children were excused from drill because they were up to standard so that they had the time to give to study on other subjects on each of 40 days, the saving would be 320 lessons. If the total saving in the class was 1120 lessons, then the time saved would be 35 per cent. The actual results for 55 classes wree as follows":

TABLE XI.—The saving in time effected by means of the Courtis Standard Practice Tests.

Number of classes.	Per cent of time saved.	Per cent of children in each grade excused at least part of the time.	
		Grade.	Per cent excused.
13	0- 5	4	19
17	6-10	5	40
10	11-15	6	39
7	16-20	7	41
5	21-30	8	40
3	31-50		
Total 55	Median, 9.2		

The prime consideration is the effectiveness of the instruction which the practice tests provide. The only published report which deals with this question is found in Bulletin No. 1 of the Bureau of Research and Efficiency of Kansas City, Mo., p. 28. The pupils who attended the Irving Summer School, 1915, were given the Standard Research Tests, Series B, Form 1, on Friday of the first week. The practice tests were used daily for twenty-two days. Then the pupils were given Form 2 of Series B. Table XII shows the per cent of gain in scores for the several groups.

TABLE XII.—Tabulation showing per cent of examples gained in twenty-two days by the use of the Courtis Standard Practice Tests.

GRADE.		Addition.		Subtraction.		Multiplication.		Division.	
		Speed.	Rights.	Speed.	Rights.	Speed.	Rights.	Speed.	Rights.
4.....	Per cent gained..	8.9	12.5	40.0	49.7	30.0	26.4	17.5	46.4
5.....	Per cent gained..	15.0	8.9	14.7	38.3	50.7	81.7	63.3	94.1
6D.....	Per cent gained..	8.4	13.5	5.0	2.5	7.1	4.8	18.5	32.0
6G.....	Per cent gained..	.0	10.2	5.6	19.7	8.0	6.2	10.0	29.5
6E.....	Per cent gained..	11.5	11.3	1.0	2.4	7.1	7.5	13.3	4.6
7.....	Per cent gained..	12.5	21.1	8.7	16.7	6.1	3.8	25.6	20.5
Average per cent gained..		9.4	13.1	12.2	20.8	18.2	20.5	24.9	37.9

Average gain in all classes, in all operations: Speed, 10.8 per cent; accuracy, 15.4 per cent.

The pupils in these groups had been counted as failures at the close of the school year, and, as might be expected, had very low initial scores. They were children who had not responded to the usual modes of instruction. That all groups showed gain and in most instances remarkable gain is suggestive of the value of the practice tests. However, these results must not be taken as conclusive evidence.

Another series of exercises, known as the Studebaker Economy Practice Exercises, and based upon some of the same general principles, has been devised by J. W. Studebaker, assistant superintendent of schools, Des Moines, Iowa. They are published by Scott, Foresman & Co. Other series of practice exercises have been devised, but, so far as the writer has examined them, they are less complete and give less promise of efficient means of instruction.

ADAPTATION OF INSTRUCTION BY THE TEACHER.

If scientifically constructed practice exercises are not available, a teacher can accomplish much by applying the principles upon which such exercises as the Courtis Standard Practice Tests are based. In the first place, the teacher must learn what her teaching problem is. She must ascertain whether her pupils need to increase in speed or in accuracy or in both; she must know whether the class as a whole needs instruction upon each type of example or whether only certain pupils need it. In fact, she must become acquainted with the needs of her pupils.

This is the first step. The second is to provide the instruction which is suited to the various needs of the individual pupil in so far as it is possible. The teacher should avoid the plan of instruction described on page —, because such a plan is uneconomical of time and is not suited to the needs of the several members of a class. Instead she can dictate several examples and stop work when a few of the faster workers have finished. If this is done the slow workers will have some examples completed. What drill the slow workers get will, therefore, be much more satisfactory than if they were not permitted to finish any examples.

The teacher must recognize that the rate at which the pupil performs the operations is important as well as the accuracy of his answer. She must train for speed as well as for accuracy. This means that in teaching the teacher must obtain a measure of the pupil's speed as well as a measure of his accuracy. If examples are dictated in groups and the work stopped as suggested in the above paragraph, the number of examples which the pupil does during the class period is a measure of his rate of working. The per cent correct is a measure of his accuracy.

The instruction can be made still more effective if the teacher will prepare a number of sets of examples, each set being confined to examples of the same type. These sets of examples should be written on cards. Then instead of dictating examples the teacher can distribute the cards and have the pupils to copy the examples from the cards. If the teacher studies the needs of her pupils it will be possible for her to distribute the cards so that each pupil will have the type of example upon which he needs practice most. The pupil is probably injured by being required to practice upon the wrong type of example, and hence it is very important that each pupil be given the type of example which he needs.

There is also a number of general features of the instruction which afford opportunity for the teacher to exhibit good judgment. If we may rely upon

the laws of habit formation, little explanation is needed after the preliminary stage of acquiring habits. Attentive repetitions with no exceptions are demanded. The teacher may lower the efficiency of her instruction by having explanations when drill is needed.

In order to be most effective, the repetitions must be attentive. This means that the drill must be effectively motivated. Arithmetic is one of the best liked of the school subjects. This is particularly true of the operations. This being the case, the motivation of drill in arithmetic is a comparatively simple matter, and in most cases it will be sufficient simply to start the pupils to work and to keep the work from lagging. When more than this is necessary the teacher must demonstrate her resourcefulness by providing an effective method or device for motivating arithmetical drill.

In many cases a pupil will not become more accurate by working more slowly. With few exceptions, pupils who are inaccurate should be urged to work more rapidly. This is just the opposite of the prevailing practice, but investigation has shown that rapid work and accurate work go together.

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CHAPTER II.

HANDWRITING.

THE PROBLEM OF MEASUREMENT.

A SPECIMEN of handwriting is a complex product of a very complex activity. Before its quality can be completely measured it must be analyzed into several factors, or the activity which produced it must be analyzed into its several actions or specific habits. The latter analysis requires too much time and effort to make it practicable in public-school work at present, except as it is applied to a few individuals. The analysis of a specimen of handwriting may be made in several ways. The procedure will be determined by the purpose which is to be achieved.

There is no device for measuring legibility directly which does not require more time than it is wise to spend in this general measurement. Speed may be measured in several ways, which result in a statement of the number of letters written in a unit of time. The choice of a method of measuring is a matter of selecting the conditions under which the pupil shall write. Until we know more about the results of various conditions it seems best to follow a practice which is generally followed. This at least furnishes a basis for comparisons with published results. So far published results are largely obtained from specimens which were secured by the writing of memorized material. For the results to be comparable throughout the grades the material must be so simple that it will not be too difficult for the lower grades. Some insist that the material should contain all of the letters of the alphabet in small letters and capitals, and a maximum of combinations. Since all of these conditions can not exist in one selection, and since the first condition is of considerable importance, the first stanza of "Mary Had a Little Lamb" has been used extensively in Kansas and is recommended for this general measurement.

TEACHERS' MARKS.

General merit or quality may be measured in a number of ways. The usual practice has been that of simply scanning the papers after a penmanship class or exercise. The resulting judgment has been based on the teacher's experience in similar cases, and has been expressed in terms of a mark, usually a letter, per cent mark, or word, such as, good, poor, etc. Such judgments do not usually take into consideration all of the factors of penmanship, nor do they assign the correct relative values to those considered. It is a frequent error of teachers to give penmanship marks and require penmanship drills with only one object in mind, such as a good movement or well-formed letters. Another error is that of ignoring such an important factor as speed of production. Furthermore, the teacher's unaided judgment makes adequate standardization of penmanship impossible. The teacher of a given class can have no definite idea of what is being accomplished in other classes. A sample of penmanship which would be marked 80 per cent or B in one class would be assigned a much lower (or higher) mark in another class of the same school grade. Under these conditions the teacher holds standards which

have but little reference to the grades higher and lower and to other classes of the same grade. Furthermore, teachers' marks have been shown to be highly inaccurate and inconsistent. The same teacher will vary widely when she marks a set of papers several times, and different teachers will vary more widely when marking the same set of papers.

The teacher's unaided judgment fails in three important particulars. It does not allow for the factors involved in handwriting, it makes adequate standardization impossible, and it is inaccurate.

Several experimental studies have pointed out the inaccuracy of the prevailing systems of marking handwriting as compared with marks based on standard scales. Kelly[1] showed that judges untrained in the use of the Thorndike Scale, but experienced in grading handwriting by the usual letter or per cent method, revealed about the same accuracy in grading by both methods. He asserts that "teachers have reduced their variability shown in the per cent method by practice at the expense of the children, while they have at the same time decreased their capacity for effective use of the standard scale." The inference is that anything approaching equal experience in the two methods of marking would result in superior accuracy in the use of a standard scale. Later investigations have established this. Gray[2] found that increased accuracy of marking was produced through training in the use of the Ayres Scale. Lewis[3] found that the use of the Ayres Scale reduced the variation of judgments by about one-half. Thorndike[4] holds that the use of the standard scale will produce more accurate results than the letter or per cent method of marking when the judges are untrained in the use of a standardized scale, and that accuracy is increased through training.

Since this manual is designed for teachers, only the teachers' problems are discussed. A discussion of the supervisor's problems is given in Educational Tests and Measurements by Walter S. Monroe (Houghton Mifflin Company.) The discussion here must assume the adoption of certain recommendations which belong in a discussion of the supervisor's problems. Among these recommendations are the choice of the Ayers[5] and Freeman[6] scales, together with a comprehensive plan for general measurement, to be followed by diagnosis and remedial instruction applied to individuals.

GENERAL MEASUREMENT.

The plan for the general measurement of handwriting is given in detail below. The teacher should follow the directions one step at a time, for the directions are given in the sequence in which they will be needed. The Bureau of Educational Measurements and Standards furnishes class record sheets, similar to the one shown in Fig. IX with each copy of the Ayres Scale.

1. F. J. Kelly, "Teachers' Marks," Teachers College, Columbia University, New York, 1914, pp. 99.

2. C. T. Gray, The Training of Judgment in the Use of the Ayres Scale for Handwriting: Journal of Educational Psychology, Vol. VI, No. 2, Feb., 1915.

3. E. E. Lewis, the Present Standard of Handwriting in Iowa Normal Training High Schools; School Administration and Supervision, Vol. 1, No. 10, 663-71, Dec., 1915.

4. E. L. Thorndike, Teachers' Estimates of the Quality of Handwriting: Teachers' College Record, Vol. XV, No. 5, 1914.

5. L. P. Ayres, A Scale for Measuring the Handwriting of School Children: Russell Sage Foundation Publication No. 113.

6. F. N. Freeman, An Analytical Scale for the Judging of Handwriting: The Elementary School Journal, XV, p. 434.

Teachers in Kansas who have copies of the scale may obtain the class record sheets free. The following directions are printed on the back of the record sheet:

Securing Specimens of Handwriting.

1. All pupils should be supplied with two or three sheets of paper of the kind which they are accustomed to use in the penmanship class.

2. See that pupils of lower grades are supplied with well-sharpened pencils if they do not use pen and ink. There should be extra pencils provided, or else any who break pencil points should be given a chance to rewrite the specimen. If this can not be done reject these specimens.

3. If children use pen and ink see that they are provided with a supply of clean ink and good pen points.

4. When children have paper and pencil or pen and ink proceed thus: Read aloud a stanza—four lines of the poem, "Mary had a little lamb." (See page 000.) (Children who have difficulty in learning or remembering the whole stanza may write the sentence, "Mary had a little lamb," over and over. Other sentences may be used, but the results would not be comparable.) Have the children recite this stanza aloud in unison until you are sure they all know it. Then ask them to write it once. Collect these copies and destroy them. Do not tell the children they are to be tested in any way. Next instruct the children as follows:

"Write the stanza of the poem which you have learned. Write it just as you would in a composition or in an ordinary school exercise. If you finish the stanza write it over again, and keep on writing until I tell you to stop. Write on only one side of the paper. We must start together and stop together. Lay your papers on your desk in position. Have pen and ink ready. When I say 'Get ready,' place your hand in position to write, but do not begin to write until I say 'Start.' Then all begin at once. When I say 'Stop,' I want you all to stop at once and raise your hands so that I can see that you have stopped."

Now take your watch in hand, and when the second hand reaches the 55-second mark say, "Get ready." Exactly at the 60-second mark say "Start." At the end of three minutes call out, "Stop; hands up." Be sure to allow exactly three minutes. Have each child write name, grade and age on the *back* of paper. Collect the specimens at once and put them together.

Use a stanza of this poem in collecting samples of handwriting:

I.

Mary had a little lamb,
Its fleece was white as snow;
And everywhere that Mary went
The lamb was sure to go.

II.

5 10 15 20 25
He followed her to school one day;
30 35 40 45
That was against the rule;
50 55 60 65 70 75
It made the children laugh and play
80 85 90 95 97
To see the lamb in school.

III.

5 10 15 20 25
And so the teacher turned him out,
30 35 40 45
But still he lingered near,
50 55 60 65 70
And waited patiently about
75 80 85 89
Till Mary did appear.

RATING FOR QUALITY.

Preliminary Exercise for Teachers Not Trained in the Use of the Ayers Handwriting Scale. Select ten specimens at random. Number these specimens and place their numbers on a blank sheet of paper. Now take the first specimen and rate it thus: Place the Ayers Scale on a table in full view and in a good light. Determine whether the specimen is vertical, medium slant or full slant, like the A, B or C division of the scale. If it is medium slant pay no more attention to the A and C divisions of the scale. Place the specimen directly under the scale division marked 20 and move it along toward 90, comparing it with each division. Decide which division of the scale it resembles most in quality. Then place it under the scale division marked 90 and work back towards 20 in the same row as before. Decide again which division it resembles most in quality. If your two judgments agree, mark the scale value on the blank paper opposite the numeral 1. If the two judgments do not agree, compare the specimen again with the divisions of the scale and determine which it most nearly resembles. Proceed to rate the other specimens in this manner, keeping the record for each. When you have finished ten specimens, lay this record aside, out of sight. Rate the ten specimens a second time, again keeping the records and again laying the records aside. Do this a third time, and when you have finished compare your three ratings for each of the ten specimens. If the ratings for any one specimen vary more than ten, satisfy yourself as to which rating is the correct one by comparing it with the scale again.

Rating the Specimens for Permanent Record. After becoming familiar with the use of the scale, proceed to rate the specimens, working always from 20 to 90 and from 90 to 20, and compare the two ratings as directed in the preliminary exercise. Then record your rating in the upper right-hand corner of the specimen. Whenever a teacher suspects that her ratings of specimens of handwriting are unreliable she should repeat the preliminary exercise with another set of ten specimens selected at random. But the teacher should remember that at best this judgment will be approximate. A variation of one step in the scale does not necessarily constitute an unreliable judgment. The teacher should guard against a worried state of mind. Rate rapidly without stopping to deliberate.

"A second and better method[7] is for the scorer to sort into separate piles all of the papers to be rated, putting in one pile those which he judges to be of quality 20, in another those which he judged to be of quality 30, and so on for all of the different qualities. He then carefully compares all of the papers in each pile with each other and with the specimens of that value reproduced on the scale, so as to make sure that he has not included in the pile any specimens that might more justly be assigned to the next higher or lower piles. This method involves more work than the first but insures better results.

"Still more trustworthy results can be secured without the expenditure of an unreasonable amount of time by having the scoring done by three persons simultaneously, of whom at least two must agree before the sample being judged is assigned a rating. Three people working together may use either of the two methods described above. Results so obtained are not so accurate as they would be if three or more judges rated all of the papers independently and the several sets of ratings were thus combined so as to find their central tendency. On the other hand, by doing the work simultaneously the results are far more rapidly obtained and are not greatly different in accuracy from what they would be if the ratings were made independently."

RATING FOR SPEED.

For the specimen you are rating, multiply the total number of letters in the stanza by the number of times the stanza has been completely written. Consult the printed copy,[8] and from the small numerals determine the number of letters in the unfinished stanza. Add this number to the product obtained as directed above. Record this sum under your rating for quality in the upper right-hand corner of the specimen, thus: 70
219

RECORDING SCORES.

After the samples are rated the teacher must be careful that her papers are grouped correctly by classes. If she has but one grade of pupils, say fifth grade, or two divisions of one grade, say fifth A and fifth B, then her papers are all grouped together and but one distribution made. If, however, she has parts of two or more grades, say part fifth and part sixth, she must fill out a separate record sheet for each division.

Sort the papers from one class on the basis of quality. (For instance, put into one pile all those papers having a quality of 90, into another put all the 80's, into another all the 70's, and so on.) Then, one pile at a time, resort the papers in each of these piles on the basis of their rating for speed. (For instance, if there were ten papers of quality 60, whose speeds were, 150, 159, 165, 185, 185, 191, 209, 215, 232, 240, the first three would be piled together, the next four would form a second pile, the next two a third pile, and the last one would be placed by itself.) Next count the number of papers in each of these piles and record the numbers in the proper vertical column of the table. (In our illustration this is the column under 60. There are three papers in the pile whose speeds are 150-179. Place a figure[16] 3 in the 60 column and directly opposite the numerals 150-179. There are four papers in the pile whose speeds are 180-209. Hence a figure 4 is to be placed in the 60 column

7. L. P. Ayres, A Scale for Measuring the Quality of Handwriting of Adults: Russell Sage Foundation, Division of Education, Bulletin E 135, p. 9.

8. See page 34.

16. See class record sheet, Fig. IX.

and opposite the numerals 180-209. Each of the other piles is to be treated in the same way.)

When all the scores have been entered find the sum of the figures in each vertical column and in each horizontal row. If your records have been accurately made, the sum of the horizontal totals will just equal the sum of the vertical totals. Save all specimens for future use.

COMPUTING CLASS MEDIANS.

Do not study this until you have recorded the scores.

A median is a mid-measure—the measure such that there are just as many scores larger as there are smaller.

FIG. IX.

Class Record Sheet—Handwriting, Using the Ayres Scale.

City..... School..... Grade.....

Teacher..... Date.....191...

DISTRIBUTION OF PUPILS' SCORES.

Number of letters written in three minutes.	Quality.								Total for speed.
	20	30	40	50	60	70	80	90	
Below 30									
30 to 59									
60 to 89									
90 to 119									
120 to 149									
150 to 179									
180 to 209									
210 to 239									
240 to 269									
270 to 299									
300 to 329									
330 to 359									
360 to 389									
390 to 419									
420 to 449									
Over 450									
Total for quality									

Approximate Class Medians: Quality.....Speed (Letters per 3 min.).....

True Median: Quality.....Speed (Letters per 3 min.).....

Stanza used .....

In order you may compare your class with other classes find the approximate median for speed and qualify as follows:

1. Find half of the total number of scores. For example, if the total is 28, the half is 14. If the total is 27, the half is also 14.

2. To find the class median for quality, begin at the left of the row of totals for quality. (This is at the bottom of the record sheet.) Add the totals until the sum is equal to the half sum which you have found, or until the addition of the next total would exceed the half sum. The approximate class median is the quality which stands at the top of the next column.

3. The approximate class median for speed is found in the same way, beginning at the top of the totals at the right of the record sheet. The same half sum is used. The approximate median for speed will be the first of the two numbers expressing the number of letters written in three minutes, and will always end with a cipher.

4. When you have found the approximate class medians, record them in the spaces at the bottom of the record sheet.

5. Directions for computing the true medians are found on page 000 of this manual. When there are fewer than 15 pupils in a class the distribution of the pupils' scores furnishes a better basis for evaluation than the medians.

EVALUATION OF CLASS SCORES.

When the class record sheets are filled out the material for a general survey of the handwriting of a school is complete. The task of interpreting this material remains. Several interpretations may be made by the teacher. First, the class medians for speed and accuracy should be compared with the standard scores given in Table XIII.

These standards were fixed by the consideration of two questions; First, What degree of excellence in writing should the pupil possess in order to be able to meet the demands which will be made upon him? and second, What degree of skill is attainable under specified conditions in the school? The standards of quality are stated in terms of the Freeman, Ayres and Thorndike scales. Freeman[9] stated them in terms of the Ayres Scale alone. The interpolations are based upon data provided by Freeman[10] and Starch.

TABLE XIII.—Standard proposed by Freeman.

	School Grade.						
	II.	III.	IV.	V.	VI.	VII.	VIII.
Speed (letters per min).....	36	48	56	65	72	80	90
Quality (Ayres Scale).....	44	47	50	55	59	64	70
Freeman Scale*.....	18	19—	19	20	21	22	23
Thorndike Scale.....	9.36	9.75	10.13	10.76	11.34	11.89	12.65

*These values are based on those secured by the use of the old edition of the Freeman Scale in which the values assigned to specimens of letter formation were 2, 6 and 10, in place of 1, 3 and 5, as they are in the new edition. Hence, upon comparing a score based on the new form of the Freeman Scale the values assigned to letter formation should be doubled.

The Freeman standards are approximately the average attainment of the upper half of some 5000 pupils in each of the several grades. The specimens were collected in 56 cities of 30,000 inhabitants and over, by the use of directions similar to those given above. These standards are thought to be at-

9. Fourteenth Yearbook, part I: National Society for the Study of Education, p. 76.

10. Frank N. Freeman, Teaching of Handwriting, pp. 145-150.

tainable with an expenditure of not over seventy-five minutes a week. Since the average native ability of groups of children probably does not vary to any considerable extent, and since the time spent may be controlled, superior ability and training of teachers and superior methods of instruction and supervision would account for differences between these standards and the median scores of other groups.

The teacher should find the true medians for the class, following the directions given on page 10. If the true median for quality is as low or lower than the standard of the grade below, it indicates an unsatisfactory condition. For example, the standard of quality for the fourth grade is 50 and for the fifth grade is 55. If a fifth-grade class median for quality is 50, the teacher of that class is not securing satisfactory results so far as quality

TABLE XIV.—Showing distribution of pupils' scores for a third grade.

Number of letters written in three minutes.	Quality.								Total for speed.
	20	30	40	50	60	70	80	90	
Below 30	1	.....	.....	.....	.....	.....	.....	.....	1
30 to 59	1	.....	1	2	.....	.....	.....	.....	4
60 to 89	4	11	4	1	.....	.....	.....	.....	20
90 to 119	1	3	1	.....	.....	.....	.....	.....	5
120 to 149	1	2	1	.....	.....	.....	.....	.....	4
150 to 179	1	3	1	.....	.....	.....	.....	.....	5
180 to 209	2	.....	.....	.....	.....	.....	.....	.....	2
Total for quality	11	19	8	3	.....	.....	.....	.....	41

True median: Quality, 35.3; speed (letters per 3 min.), 85.
Standards: Quality, 47; speed (letters per 3 min)., 144.

TABLE XV.—Showing wide distribution of pupils' scores for a fourth grade.

Number of letters written in three minutes.	Quality.								Total for speed.
	20	30	40	50	60	70	80	90	
80 to 89	1	.....	1	1	1	.....	.....	.....	4
90 to 119	2	.....	1	.....	2	.....	.....	.....	5
120 to 149	1	1	.....	1	.....	.....	.....	.....	3
150 to 179	3	1	.....	.....	1	.....	.....	.....	5
180 to 209	.....	1	2	.....	.....	.....	.....	.....	3
210 to 239	.....	2	.....	.....	1	.....	.....	.....	3
240 to 269	2	.....	2	1	1	.....	.....	.....	6
270 to 299	.....	2	.....	1	1	.....	.....	.....	4
300 to 329	.....	1	.....	1	.....	.....	.....	.....	2
330 to 359	.....	.....	.....	.....	1	.....	.....	.....	1
Total for quality	9	8	6	5	8	.....	.....	.....	36

True median: Median, 41.7; speed (letters per 3 min.), 209.
Standards: Quality, 50; speed (letters per 3 min.), 168.

of handwriting is concerned. Because the measurement of speed is more accurate than the measurement of quality, the rule of interpretation for speed may be more rigid. The standard of speed for the fifth grade is 65 letters per minute. Then all fifth-grade classes should reach this standard when writing uniform material under the conditions of the directions given.

TABLE XVI.—Showing distribution of pupils' scores for a fifth grade.

Number of letters written in three minutes.	Quality.								Total for speed.
	20	30	40	50	60	70	80	90	
120 to 149			2	1					3
150 to 179			4	3		1			8
180 to 209	1	3	6	3	3	1			17
210 to 239			3	5	1	1			10
240 to 269				2					2
270 to 299				1					1
Total for quality	1	3	15	15	4	3			41

True median: Quality, 51.3; speed (letters per 3 min.), 197.
Standards: Quality, 55; speed (letters per 3 min.), 195.

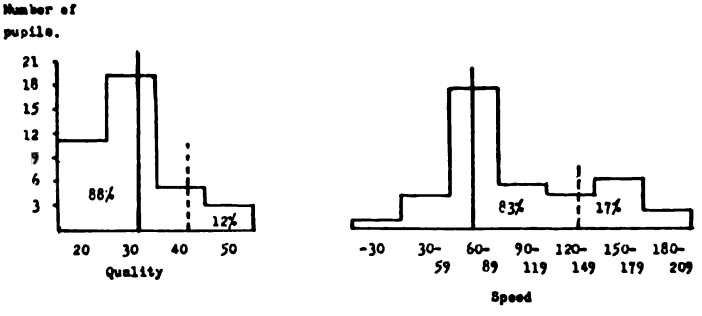

FIG. X. Distribution of scores for a third-grade class of forty-one pupils. The solid perpendicular line indicates the median of this class; the broken line shows the standard median. Quality scores are given in terms of the Ayres Scale; speed scores in letters written in three minutes.

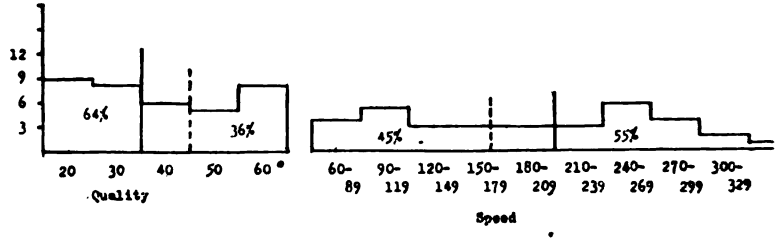

FIG. XI. Distribution of scores for a fourth-grade class of thirty-six pupils. The solid perpendicular line indicates the median of this class; the broken line shows the standard median. Quality scores are given in terms of the Ayres Scale; speed scores in letters written in three minutes.

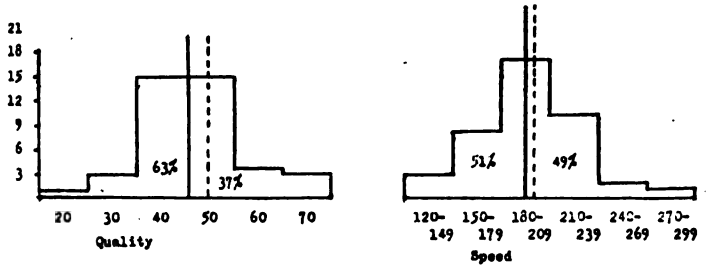

FIG. XII. Distribution of scores for a fifth-grade class of forty-one pupils. The solid perpendicular line indicates the median of this class; the broken line shows the standard median. Quality scores are given in terms of the Ayres Scale; speed scores in letters written in three minutes.

Figs. X, XI, and XII and Tables XIV, XV and XVI show distributions of scores in speed and accuracy for three classes. Fig. X represents the distribution of scores for a third-grade class. The numerals along the bottom of the figure denote quality on the Ayres Scale and speed in terms of letters written in three minutes. The numerals along the side indicate the number of pupils. A perpendicular solid line shows the location of the median for the class and a perpendicular broken line shows the location of the standard for that grade. The per cents on the face of the figure tell the per cent above and below the standard. This same general explanation will fit Figs. XI and XII.

The distribution of the scores for a class often reveals the true condition more accurately than the medians. It is easy to be seen that a class might have a satisfactory median score and still have many individual scores that were extremely low, if other scores were correspondingly high. Other things being equal, that class whose scores are grouped closely around the median indicates a better condition than a class whose scores are scattered widely. In a close grouping the indication is that all students are receiving about the same degree of attention or neglect. If the median is up to the standard and the distribution is not scattered the outcome of the instruction is satisfactory. Such a distribution is shown in Table XVI and graphically in Fig. XII. This distribution should be compared with that found in Table XV and Fig. XI. Note that in Fig. XI the distribution for speed shows the median to be above the standard, while for quality the median is below the standard. Taking this fact, together with the very wide distribution of the fourth-grade class represented, suggests a quality of teaching much inferior to that suggested by the records of the fifth-grade class shown in Fig. XII. Fig. X and Table XIV show a third-grade class which has over 80 per cent of its members below the standard in speed or quality. An examination of Table XIV reveals that not one member of this class is above the standards in both speed and accuracy, while the fourth and fifth grades have 22+ per cent and 25 per cent, respectively, of their members who have scores higher than the standards.

DETAILED ANALYSIS OF SPEED.

When the teacher has discovered those pupils who are below the standards given, a more searching analysis of the factors of handwriting is needed in order to discover the causes of the low scores.

The factors which enter in determining the speed of writing are observable. The kind of movement is certainly an important factor. Three movements may be considered: first, finger movement; second, "arm movement," sometimes called "muscular movement," in which there is

FIG. XIII.

Standard Score Card for Measuring Handwriting.

BY C. TRUMAN GRAY.

Pupil..... Age..... Date.....

Grade..... School.....

Sample Number..... Teacher.....

SAMPLE.	Perfect score.		Score.
1. Heaviness	3		
2. Slant	5		
Uniformity			
Mixed			
3. Size	7		
Uniformity			
Too large			
Too small			
4. Alignment	8		
5. Spacing of lines	9		
Uniformity			
Too close			
Too far apart			
6. Spacing of words	11		
Uniformity			
Too close			
Too far apart			
7. Spacing of letters	18		
Uniformity			
Too close			
Too far apart			
8. Neatness	18		
Blotches			
Carelessness			
9. Formation of letters	(26)		
General form	8		
Smoothness	6		
Letters not closed	5		
Parts omitted	5		
Parts added	2		
Total score			

Scored by.....

some movement of the fingers and considerable movement of the arm; and third, free-arm movement, in which "the respective movements of the fingers and of the arm are proportionally equal in amount."[11] Of these types of movement, the "arm movement" seems to be most rapid.

A second important factor is that of hand position. The hand may hold the pen in a free and easy manner, in a cramped and tense manner, or in any of a variety of unusual or peculiar positions. The free and easy or loose-hand position appears to be most conducive to speed.

Two other factors may be taken into consideration. These are age and sex. In general older children write more rapidly, so that children who are below the average age of their grade may be expected to write somewhat more slowly than the standard speed. There is some evidence to show that girls write more rapidly than boys.

A mental attitude which leads the child to draw letters instead of writing them is a factor which sometimes exists with pupils whose scores for speed are low.

The teacher by observing the pupils who write very slowly can determine which of these factors are operative in each case.

DETAILED ANALYSIS OF QUALITY.

Two devices may be used in making a detailed analysis of quality. The first is the score card devised by C. T. Gray[12] given on page 42, and the second is the Freeman Scale.[13] The former device has not been used sufficiently to enable us to speak of its value. The Freeman Scale has been tried rather extensively with satisfactory results. It is conceivable that the two devices might be used together. The score card is described in the bulletin named in the footnote. The Freeman Scale is described below.

DESCRIPTION OF THE FREEMAN SCALE.

There are five divisions in the Freeman Handwriting Scale. Each division represents three degrees of excellence.

The first division represents three degrees of uniformity of slant. Lines drawn parallel to the down stroke of the two or more space letters show the slant and assist in judging the degree of slant. This judgment may be made easier by using a sheet of transparent paper on which alinement and slant gauges are drawn. (See Fig. XIV.) If the series of lines on the slant gauge which most nearly resemble the slant of the specimen of the handwriting to be judged is placed over the writing, the degree of variation can be estimated by comparison with these lines. It may be noticed that the amount of difference between ranks 1 and 3 is greater than that between ranks 3 and 5.

The second division represents three degrees of uniformity of alinement. This is measured with reference to the tops and bottoms of the one-space letters. The degree of deviation was calculated on the basis of the average deviation in the distance of these points from a straight base line. The alinement gauge on transparent paper will aid in judging when placed over the specimen to be judged. (See Fig. XIV.) It must be noted that devia-

11. S. Monroe Graves, A Study in Handwriting; Journal of Educational Psychology, vol. VII, p. 486; October, 1916.

12. C. T. Gray, A Score Card for the Measurement of Handwriting; Bulletin No. 37; 1915, University of Texas.

13. F. N. Freeman, The Teaching of Handwriting; Houghton Mifflin Company, 1915. The directions for the use of this scale are modeled after this book chiefly. Every teacher of handwriting should have this valuable book.

An Analytical Scale for the Judging of Handwriting: The Elementary School Journal, XV, p. 434.

The Freeman Scale, with complete directions and individual record cards, may be obtained from the Bureau of Educational Measurements and Standards, Emporia, Kan.

tions in alinement are more noticeable when the letters are close together than when they are spread far apart. This error must be consciously guarded against.

The third division shows the quality of the line or stroke. The stroke should be smooth, firm, and even. On the right side of the chart, letters are shown enlarged, so that defects of line may be readily seen. This suggests that in judging a specimen a reading glass will be of considerable assistance. In any case the enlarged letters assist by fixing the attention on the defects, after which they are more readily detected in the original. Quality of line is important, as it indicates something of the character of the movement, and it affects the beauty and legibility of the writing.

We may note that these three classes of defects—that is, defects in uniformity of slant, uniformity of alinement and in quality of line or stroke—are due to lack of coördinations, or cramped muscles. This may be seen by noting the cause of defects 1, 2, 3, 4 and 5 in Table XVII. Improvement in these must come by the acquirement of an easy, fluent, regular movement. In correcting defects here attention must be called to the movement, while the defects shown in 6 and 7 are to be corrected by calling attention to the letters and words. Both in diagnosis and in remedial drills this distinction must be kept in mind.

The fourth division shows the forms of letters. The types of illegible forms of letters which should be counted as errors in using the fourth division are described by Freeman on page 133 of The Teaching of Handwriting. A figure illustrating them is found on page 135 of the same book. Only a suggestion of the types is given here. These are the gross errors which occur only in the most careless writing:

1. A loop left open which should be closed, or a loop closed which should be left open, as in letters *a*, *d*, *f*, *g*, *s*, *v*.
2. A stroke running higher or lower than it should, as in *b*, *f*, *k*, *l*.
3. Part of the letter is slurred over, which causes it to lose its characteristic form.
4. Substitution of angles for curves and curves for angles, as in *m*, *n*, *w*.
5. Substitution of loops for return strokes along the same line, or the reverse, as in *c*, *d*, *e*, *f*, *i*, *t*, etc.
6. Substitution of a return stroke for an open curve, or an open curve for a return stroke, as in *r* and *y*.
7. A stroke may be faulty in direction or misplaced, as in *t*, *u*, *x*, etc.
8. Small letters and capitals are often confused because of their sizes, as in *a*, *c*, *g*, *m*, *n*, etc.

As a general principle, no letter should vary from its conventional form in such a way that it is likely to be confused with another letter or to lose its characteristic form.

Consistency of letter formation should also be emphasized. That is, while we are not attempting to choose between different types of script, we must insist that the letters conform to the type selected by pupil or teacher.

The fifth division shows different kinds of spacing. Here attention is drawn to spacing between words and between letters. (The spacing between lines may be judged without a scale.)

The faults of most importance are: (1) Crowding of letters; (2) spreading letters too far apart; (3) crowding the words.

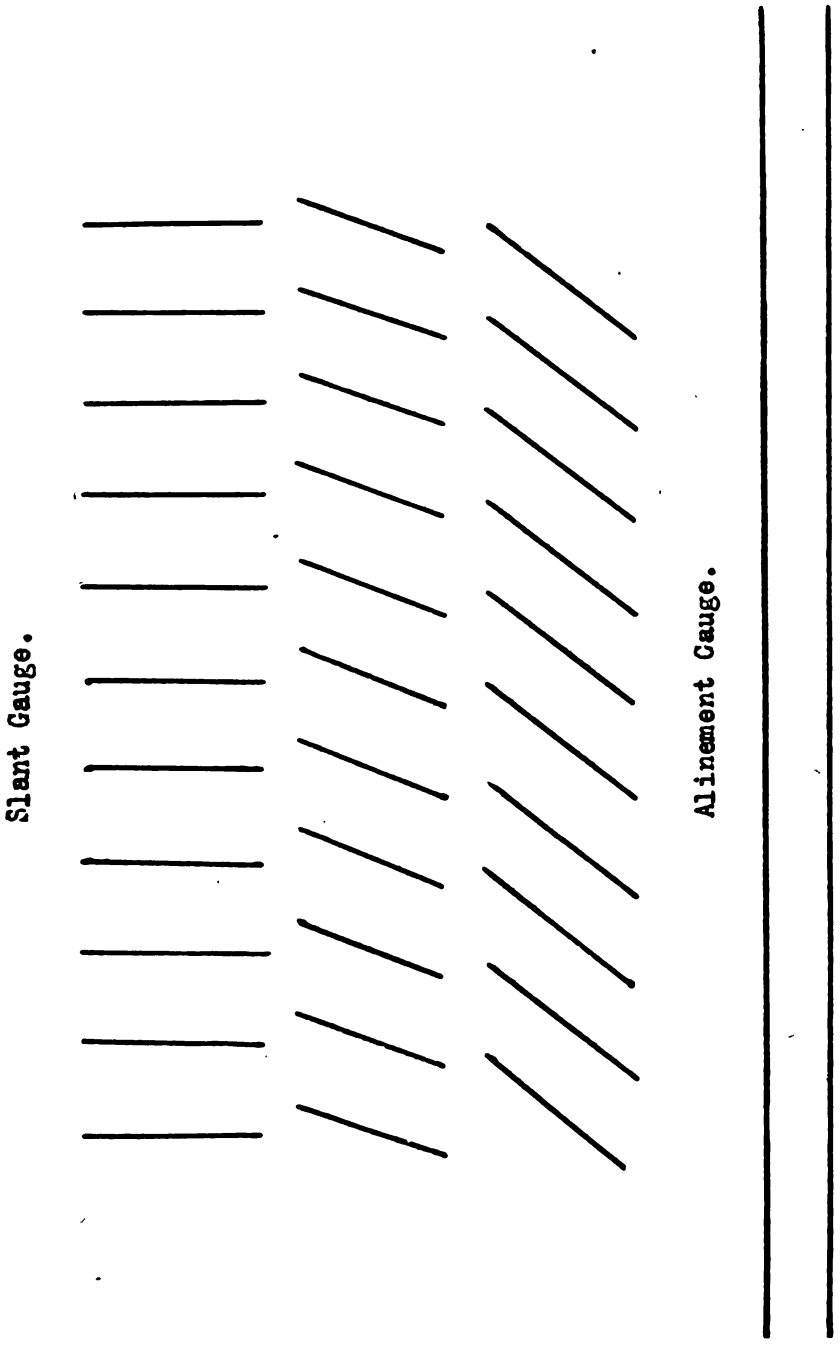

FIG. XIV. This slant and alinement gauge, printed on transparent paper, may be secured from the Bureau of Educational Measurements and Standards, Kansas State Normal School, Emporia, Kan.

The specimens should be collected and scored for speed first. If a pupil has written at a speed much below the standard another specimen of his handwriting should be secured. In securing this the teacher should tell him that he must write faster. If any have written at a speed much above standard, but low in quality, they should be tested again being directed to write more slowly.

This second set of specimens should then be analyzed by means of the Freeman Scale and the results of the analysis recorded on the individual record card under the heading "Second trial." On the individual record cards the word "division" should be substituted whenever the word "chart" appears if the new edition of the scale is used. The comparison of the pupil's second scores with those of the first trial will furnish a basis for further remedial drills and more practice. After another interval of drill a third set of specimens should be collected from those pupils who were not up to standard at the time of the second trial. These specimens should be analyzed and the scores recorded as before. There may be a few cases in which a fifth or even a sixth trial may seem advisable. In such cases use a second individual record sheet and change the headings to indicate the fifth, sixth, etc., trials. There should be about the same amount of practice between successive trials as there was between the first and second trials.

Table XVII gives a detailed analysis of the faults which appear in the child's handwriting and suggests the adjustments which are necessary to correct them.

TABLE XVII.—Analysis of defects in writing and their causes, in use by Principal Reavis. (Quoted from "Teaching of Handwriting," Frank N. Freeman, page 74.)

Defect.	*Cause.*
1. Too much slant	(1) Writing arm too near body. (2) Thumb too stiff. (3) Point of nib too far from fingers. (4) Paper in wrong position. (5) Stroke in wrong direction.
2. Writing too straight	(1) Arm too far from body. (2) Fingers too near nib. (3) Index finger alone guiding pen. (4) Incorrect position of paper.
3. Writing too heavy	(1) Index finger pressing too heavily. (2) Using wrong pen. (3) Penholder too small diameter.
4. Writing too light	(1) Pen held too obliquely or too straight. (2) Eyelet of pen turned side. (3) Penholder of too large diameter.
5. Writing too angular	(1) Thumb too stiff. (2) Penholder too lightly held. (3) Movement too slow.
6. Writing too irregular	(1) Lack of freedom of movement. (2) Movements of hand too slow. (3) Pen gripping. (4) Incorrect or uncomfortable position.
7. Spacing too wide	(1) Pen progresses too fast to right. (2) Too much lateral movement.

When pupils have attained the standards both in speed and quality of handwriting for their respective grades, it may be assumed that they have done satisfactory work. Pupils who have achieved the standards both in speed and in quality for the eighth grade may well be excused from the penmanship class as long as their handwriting is up to the standards. At least they should be allowed to choose whether they will develop greater skill in

handwriting or spend the time on other activities. The same liberty of choice might be extended to some other pupils who are well beyond the standard for their grade and who have strong interests or outstanding needs which will be satisfied by other employment of the time. This should rest on the teacher's judgment. But since all children do not progress at a uniform rate in learning to write, and since the same child may vary from time to time in his progress, it would not be wise to excuse children from further drill in handwriting when they have only achieved the standards for their grades.

When pupils' individual scores are below either one or both of the standards of handwriting for their respective grades, their work in handwriting has not been satisfactory. This statement is based on the consideration that the standards proposed are assumed to be the lowest that are feasible. They represent the minimum of skill for the successful use of handwriting by the average pupil. The teacher should then seek the causes for such unsatisfactory work. These causes may be sought in two directions: (1) in the general conditions under which handwriting is acquired, and (2) in the specific habits of the pupils. Only brief suggestions under each of these heads can be made here.

1. The general conditions under which handwriting is acquired include all those factors which influence the handwriting of all the members of the class. Equipment and course of study are among these factors. Time allotment is another, but it has been shown that the standards proposed may be achieved with a time expenditure of not over seventy-five minutes a week.[15] Indeed, this is accomplished in many schools. The training and skill of the teacher and the methods and devices of teaching are other factors. Of the devices used, the scales described may be used with advantage. Any one of the three scales now in use may be displayed so that all the pupils of a class may have a chance to compare their work with the standard. Some teachers testify that this furnishes a good motive for penmanship practice, but pupils usually overrate their own handwriting. Of greater value to the pupil is the realization that his work is being accurately estimated and at least partially analyzed. Saying that a child's writing is poor and deserves not more than 50 per cent is to the pupil bad news, with small hope. Showing the pupil that he is writing too slowly, that the rest of the class write ten letters more than he writes in every minute, or that his writing is not as good as 40 on the Ayres Scale, is giving him a definite objective for his efforts. When this is followed by a careful analysis and enumeration of the defects of the handwriting, with directions for the next step to secure mastery, the student has an adequate motive for future practice.

Still another factor is that of definiteness of aim possessed by the teacher. If the teacher has in mind only the vague aim of producing a "good business hand," or that mythical ideal of 100 per cent, it is difficult to see how she can help John to take the next step necessary. If the teacher defines the aim in terms of standards of speed, slants, etc., the next step will be more clearly seen.

The process of learning to write is essentially a process of habit formation. Hence, these general conditions should conform to the known laws of habit formation. The law as stated by James, "Never suffer an exception to occur

15. The Fourteenth Yearbook of the National Society for the Study of Education: University of Chicago Press, Part I, p. 77.

till the new habit is securely rooted in your life," demands that the teaching of handwriting should not be confined to the class in handwriting alone. Good penmanship is a habit which may be acquired in the penmanship class and elsewhere under the proper conditions. On the other hand, the habit may be broken down in any class when improper conditions prevail. To require a child to use good pens and ink, good paper, proper position, etc., in the penmanship class, and then to allow the child to use a stub pencil, poor paper, and any movement or position he may choose in other classes, is to violate a basic law of habit formation. To make good handwriting a well-fixed habit the pupil must repeat the activity over and over, always keeping up the best adjustment which he has learned. Every exception to this adjustment weakens the habit. Hence, the controllable conditions which affect the production of handwriting should be made uniform in all cases where penmanship is used. The highly effective teaching of penmanship found in many business colleges and commercial departments is usually accomplished by obeying this law. Often this means a period of intensive practice for securing a good start, followed by various devices for securing attentive repetitions.

The specific habits of the pupils may be, and many are, the result of the general conditions. Many of these bad habits of writing will be eliminated or reformed when the general conditions are corrected. Others must have special treatment. These may be studied more easily if the pupils are classified in groups. An examination of the pupils' scores will reveal the following groups:

Pupils Whose Scores for Speed are Below the Standard. These pupils are in danger of acquiring a fixed habit of writing which will fail them when the need for rapid writing arises. This need arises in the upper grades and in high school, in the writing of quizzes, themes, lecture notes, etc. The teaching of handwriting in the penmanship class and elsewhere should seek to produce a habit of handwriting that will work at a speed which is adequate for the ordinary needs which the pupils will meet in the upper grades, in high school, or at a later time. Therefore, in their practice they should be led to *write at the standard speed.* This does not mean that they should merely go through the usual writing exercises of ovals, lines, etc., at high speed, but it means that they should write dictated or memorized sensible material at a standard rate for several consecutive minutes. For example, the sentence, "The quick brown fox jumps over the lazy dog," contains 35 letters.

8th-grade	pupils should write this	11 times in 4 minutes.
7th-grade	pupils should write this	8 times in 3 minutes and 30 seconds.
6th-grade	pupils should write this	6 times in 3 minutes.
5th-grade	pupils should write this	5 times in 2 minutes and 45 seconds.
4th-grade	pupils should write this	4 times in 2 minutes and 30 seconds.
3d-grade	pupils should write this	3 times in 2 minutes and 10 seconds.
2d-grade	pupils should write this	2 times in 2 minutes.

The pupils should memorize the sentence and write it several times for practice and for spelling. The teacher should then time their writing according to the table given above. Those who do not write the required number of letters in the allotted time should be told to write faster until they have met the test successfully. When they have succeeded in writing at standard speed, an examination of their penmanship will probably show that many of the pupils have allowed the quality of their penmanship to suffer. The pupils may determine this for themselves by comparison with

samples written before at a slower rate, or, better still, by comparison with the Ayres Scale. They may then be shown the faults which hinder them from writing both rapidly and well. The same sentence, or other sentences similarly adapted, should be used as often as the teacher considers them necessary.

For all practical purposes, this device reduces the class to the following group:

Pupils Whose Scores for Quality are Below the Standard. The chief fault in this group is their lack of proper conceptions of one or more of the following: spacing, letter forms, quality of line, uniformity of slant, or uniformity of alinement. The pupils must have vivid ideas of these factors which make up quality before practice can become effective. They can not secure these ideas by looking at a copy alone. They should see the teacher produce the copy, and then acquire the recognition of form more thoroughly through repeated attentive imitation of the process. While drills for movement will be valuable, they should not be overemphasized just here lest they distract the pupil's attention from the form or quality.

Sometimes it is well to call the pupil's attention to a single letter or combination, and make this vivid by repeating the warning or suggestions which are most effective. When a single fault is corrected another may be attacked until the pupil acknowledges his power to correct his faults. Drills for improving the quality of handwriting should be prescribed to fit individual needs on the basis of individual diagnosis. The Freeman Scale will be useful here. Any good manual of penmanship will furnish suggestions for drills, but these drills must be used for meeting specific needs of individuals and not as class exercises.

Aside from the pupils included in the group described, there will be a few who through lack of ability to properly coördinate their muscles, or through other more serious defects, are incapable of responding to drill in a satisfactory manner.

A few pupils may be writing too rapidly. No pupil should be encouraged to write faster than the standard for his grade unless the quality of his penmanship is above the standard. On the other hand, as has been indicated, it is unwise to try to secure a superior quality of handwriting when the speed is low.

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CHAPTER III.

SILENT READING.

THERE are two quite distinct abilities which go by the same name—reading. The ability to get meaning for oneself from the printed page is very different from the ability to express the meaning of the printed page to others. Nor does the latter ability include the former. Children who read orally quite fluently are found often to master a rather meager portion of what they read. In fact, it is believed that habits of reading which are established by the too exclusive use of the oral type of reading frequently work to prevent the adequate development of silent reading ability. Nevertheless teachers give but little conscious attention as yet to the development of this thought-getting ability, or ability to read silently. In our schools most reading work consists of oral expression, particularly in the early years of the course.

This fact is the more unfortunate considering the importance of silent-reading ability. Progress in school depends upon it more than upon any other factor. Failure in history or geography or language, or even arithmetic, is due more often to poor silent reading ability than to any other cause. More use is found for silent-reading ability than for all other products of the school put together. This is true not only during school days, but also in life after school. For every page that we read orally, for example, we probably read a hundred pages silently. Whether we continue in self-improvement throughout life depends most largely upon whether we can read silently with ease and pleasure. Therefore, any movement which promises to direct greater attention to the problem of silent-reading ability must be welcome.

THE PROBLEM OF MEASURING ABILITY TO READ SILENTLY.

One reason for our tardiness in taking up seriously the problem of developing ability in silent reading is the intangibleness of the desired product. It is easy to state for any given grade what words the children should be able to spell, or what combinations in arithmetic they should be able to do, or what selections they should be able to read aloud. It is not so easy to state just how much of the meaning they have grasped from a given paragraph. If we ask them to tell us the meaning, then a new ability is called into use, namely, composition, and we are never quite sure how much of the failure is due to trouble in reading and how much is due to trouble in composition. We have had no units in terms of which we could express a measure of silent-reading ability. The need of such units has prompted several efforts within the last two or three years to derive a test for measuring reading ability. One such effort has resulted in the Kansas Silent Reading Tests.

The Kansas Silent Reading Tests consist of a series of brief exercises, each one containing directions for doing something. If the meaning of the exercise is comprehended the directions can be followed. To illustrate, three typical exercises chosen from the series are given here:

Value 3.3.	My fingers were numb with cold from carrying my skates. My breath looked like steam before my face and froze into a thick frost on my muffler. My mother saw me coming and called, "Clean off your shoes and then come in and get warm." Which do you think I had on my shoes, mud or snow?
Value 3.5.	I have five plums and Mary has four plums. Jane comes along and we see that she hasn't any. We want to divide with Jane in such a way that we shall all three have the same number. I give Jane two plums. How many must Mary give her? ——————.
Value 3.7.	In the following words, find one letter which is contained in only three of them, and then cross out the word which does not contain that letter. all thief . live anvil

There are sixteen exercises appropriate for grades 3, 4 and 5, printed as test I; sixteen other exercises appropriate for grades 6, 7 and 8 make up test II; sixteen other exercises appropriate for the high school make up test III. The directions are uniform for all three tests, the task being to do as many of the exercises as possible in five minutes. The score earned is the sum of the values attached to the exercises correctly finished.

A Standardized Test in Silent Reading is being devised by the director of the Bureau of Educational Measurements and Standards in which the features of the Kansas Silent Reading Tests which have proved satisfactory are being incorporated. It is believed that more satisfactory exercises have been obtained. They have been taken from school readers and other books which children read.

STANDARDS.

Directions for giving the Kansas Silent Reading Tests and for tabulating the scores are not produced here, because they always accompany the tests and have been found to be easily understood by teachers. The following table of distributions, reduced to per cents, indicate how many children out of a hundred in each grade are able to secure scores between the limits stated in the table. For instance, eight per cent of third-grade children make a score of less than 1. Ten and nine-tenths per cent of third-grade children make a score between 1.0 and 1.9, inclusive. Twelve and three-tenths per cent of third-grade children make a score between 2 and 2.9, inclusive, and so on for all the per cents in all the grades. It will be noticed that these distributions are based upon several thousand children in each grade up to the high school and more than a thousand children in each high-school grade except the twelfth. Children from eighty-two cities in several states are included in these tabulations. These scores will be considered the standard for comparison throughout this monograph. It is possible thereby for each child to determine how his silent-reading ability as measured by this test compares with the silent-reading ability of children in his grade elsewhere. It is possible for the teacher to determine the same fact for her room as a whole, and it is possible for the superintendent to compare his city with a large number of other cities.

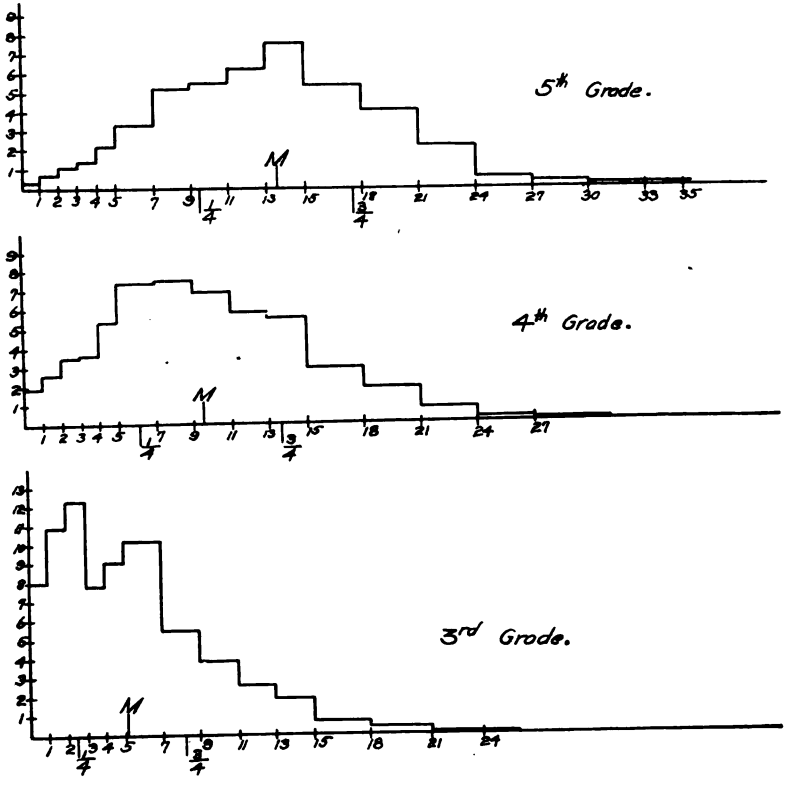

FIG XVI.

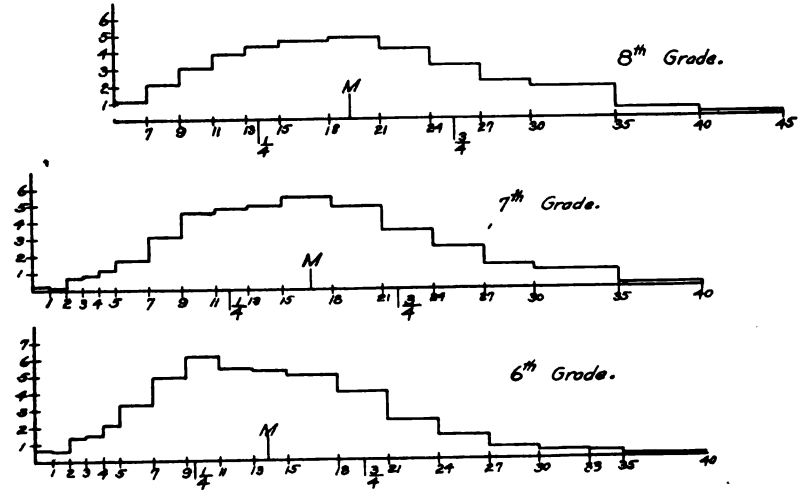

FIG. XVII.

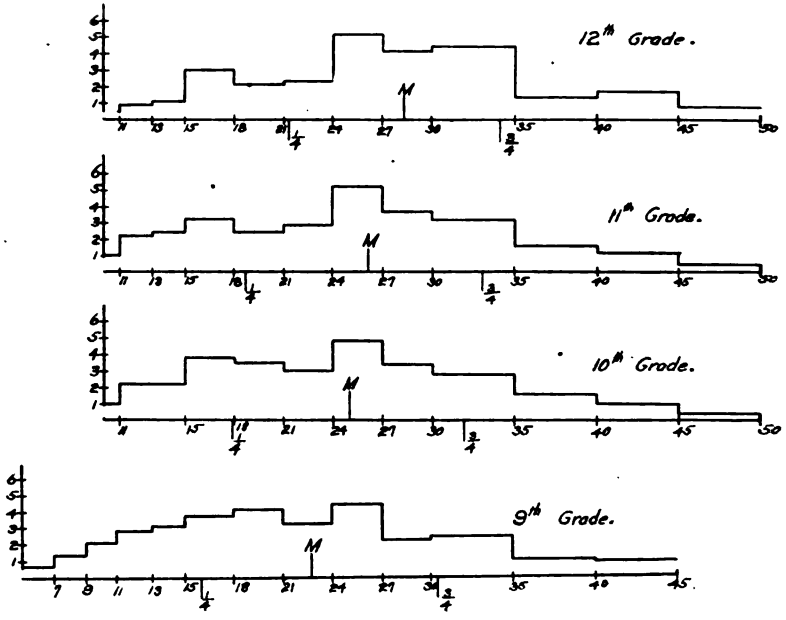

FIG. XVIII.

TABLE XVIII.—Distributions expressed in per cents by grades of scores secured in the Kansas Silent Reading Tests. Children in 82 cities. Total number of children and median scores given at bottom of table.

SCORES BETWEEN—	3rd grade.	4th grade.	5th grade.	6th grade.	7th grade.	8th grade.	9th grade.	10th grade.	11th grade.	12th grade.
0- 0.9	8.0	1.9	.3	.7	.2	.1	.4	.3	.1	.....
1- 1.9	10.9	2.6	.7	.6	.1	.2	.....	.....	.....	.....
2- 2.9	12.3	3.5	1.1	1.4	.7	.4	.2	.1	.....	.1
3- 3.9	7.8	3.6	1.4	1.5	.8	.5	.5	.4	.2	.....
4- 4.9	9.1	5.3	2.2	2.1	1.1	.9	.3	.1	.1	.....
5- 6.9	20.5	14.9	6.7	6.5	3.5	2.2	1.4	.8	.8	.3
7- 8.9	10.9	14.9	10.3	9.9	6.2	4.2	2.5	1.6	1.4	.9
9-10.9	7.8	13.7	11.0	12.2	8.9	6.0	4.2	2.1	2.0	.9
11-12.9	5.2	11.7	12.6	10.9	9.4	7.7	5.6	4.2	4.5	1.8
13-14.9	3.8	10.9	15.2	10.5	9.8	8.5	6.3	4.2	4.8	2.1
15-17.9	2.3	8.6	16.2	15.4	16.3	13.8	11.0	11.5	9.7	9.0
18-20.9	1.2	5.4	12.2	11.9	14.5	14.3	12.2	10.6	7.3	6.9
21-23.9	.3	2.2	6.5	7.0	10.2	12.2	9.5	9.0	9.0	7.0
24-26.9	.1	.6	1.4	4.2	7.1	9.2	13.3	14.5	15.5	15.6
27-29.9	.1	.4	1.1	2.0	3.8	6.2	6.7	10.1	10.6	12.3
30-34.9	.1	.2	.6	2.2	5.1	8.8	12.8	14.2	15.7	21.8
35-39.9	.02	.1	.3	.1	1.2	2.7	5.0	7.9	7.7	6.3
40-44.9	.....	.05	.1	.1	.4	1.2	4.4	5.3	7.0	8.7
45-49.9	.....	.....	.....	.2	.8	.8	2.2	1.9	2.4	3.9
50-59.9	.....	.....	.....	.3	.1	.3	1.5	.9	1.4	1.9
60-69.9	.....	.....	.....	.....	.....	.....	.3	.....	.4	.1
70-79.9	.....	.....	.....	.....	.....	.....	.1	.1	.....	.....
80-above	.....	.....	.....	.....	.....	.....	.1	.2	.....	.1
Total number children.	6,241	6,907	7,130	6,085	5,736	4,891	2,227	1,481	1,123	666
Median	5.1	9.5	13.5	13.8	16.7	19.2	22.7	25.0	26.1	28.3
25 percentile	2.5	6.1	9.4	9.4	11.8	13.7	16.0	17.9	18.7	22.3
75 percentile	8.2	13.6	17.5	19.8	21.9	25.4	30.4	31.9	33.1	34.1

The graphs (pp. 55,56) represent the facts of Table XVIII. The per cent of pupils achieving each score is indicated by the distance which the graph line is above the base line at the given score. For example, of third grade pupils, 8 per cent obtain scores from 0 to 1; 10.9 per cent obtain scores between 1 and 2, and so on.

DIAGNOSIS AND REMEDIAL INSTRUCTION.

By giving the test in her room a teacher helps to diagnose her situation, thus setting her problem of instruction in reading more clearly before herself. Many teachers have done this and have then sought help upon their problems. "What to do" is, after all, the important thing. It is in the hope of assisting teachers who are asking this question that this monograph is prepared.

Two things need to be kept clearly in mind at the outset: First, the test itself is simply an instrument for measuring and must not be confused with a teaching device. A stop-watch is a splendid instrument with which to measure a runner's speed, but does not pretend to offer help to the coach in his problem of increasing that speed. Second, the problem of teaching silent reading requires for its solution the whole of a teacher's professional education, and then a lot of common sense and experience besides. This monograph will make no effort to be a substitute for such training, common sense or experience. It will undertake only to make a few suggestions to help improve the situation revealed to a teacher by measuring the results of her instruction.

The first need is for some simple, practical device by which a teacher may make a comparison of his class with the standard scores for the same grade of pupils. To assist in doing this a graphical representation is here given of the standard scores for each grade from the third through the twelfth. (See Figs. XVI, XVII and XVIII.) On this graph are placed the median score, the 25 percentile (that point below which the lowest one-fourth of the scores fall), and the 75 percentile (the point above which the highest one-fourth of the scores fall). By comparing the scores of one's own class with these marks it is easy to determine in what respects one's class is different from the standard.

As a method of making this comparison most easily it is suggested that a graphical representation be made of the scores secured by the members of the given class on the same base line as an enlarged standard graph. The most effective way is to write upon the graph sheet the names of the pupils in just the positions along the base line to which their respective scores entitle them. Such representation tells at a glance not only that the particular class is low or average or high, but it tells also just which children are low and how much low, and just which children are high and how much high.

The situations revealed by the test fall into three types:

First, the class may correspond closely with or surpass the standard distribution in both median score and variability;

Second, the class may have a low median but satisfactory variability; or

Third, the class may have a satisfactory median but too wide variability.

In connection with each type of situation certain suggestions may be considered.

A NORMAL SITUATION.

Suppose first, then, that a teacher finds her class to correspond closely with the standard distribution. The first thing to bear in mind is that these standards have been derived from the measure of actual achievement in schools of all sorts and do not represent ideal conditions of reading ability. They are ideal in neither average achievement nor in amount of variation within a class. Certain classes and certain entire school systems have been able to achieve median scores very much higher than these standard medians and distributions with much less variability. It is a well-recognized fact, furthermore, that a very great waste in effort will continue in teaching silent reading and all the subjects dependent upon silent reading until we secure in general much less variation in ability among the members of a class than is now represented in the standard distributions. Observe, for example, that the median score of the poorest one-fourth of fifth-grade children is 7, while the median score of the best one-fourth of fifth-grade children is 20.4. This means that while one-fourth of a normal class can read one page with full comprehension, another fourth of the class can read nearly three pages with the same degree of comprehension. Class instruction based upon common assignments of reading tasks must be, under such circumstances, most wasteful. If such assignments are well adapted to the slower pupils they can not at the same time bring out the best efforts of the strong ones. It behooves a teacher, therefore, to undertake to secure a distribution much less varied than the standard, at the same time he raises his median score. Suggestions for accomplishing these two things will be made in the following paragraphs.

TO RAISE THE MEDIAN SCORE.

Suppose next that the test has revealed an unsatisfactory median score, but a satisfactorily close grouping of the scores around the median, and no individuals varying strikingly from the median. This type of situation presents the problem of increasing the average or median ability of the class as a whole.

As an indication first of how class medians vary among classes in the same grade, Table XIX is given.

TABLE XIX.—The lowest one-fourth of class medians fall below the left-hand figure, and the highest one-fourth of class medians fall above the right-hand figure.

GRADE.	Lowest one-fourth of class medians fall below.	Highest one-fourth of class medians fall above.	Number of classes considered.
Third	3.19	6.57	125
Fourth	7.6	11.5	136
Fifth	11.89	15.36	127
Sixth	11.78	16.33	111
Seventh	14.5	18.78	88
Eighth	17.06	22.72	78

From this table a teacher may know that if the median of her class, say fifth grade, falls below 11.89 her class is among the lowest one-fourth of fifth-grade classes as judged by this test.

In case then the teacher finds that her situation demands a raising of her median score while the variation is satisfactorily slight, the following suggestions may aid.

The commonest of all reasons for this situation, particularly when found in the grades below the sixth, is that the teachers have been placing chief stress upon oral reading. Where children are required to give their attention mainly to the correct pronunciation of words, the correct enunciation of sounds, and the correct inflection of the voice in passing over the several punctuation marks, not much growth in the power to comprehend meaning in the language can be expected. Where the children study their reading lessons with the point of view of being able to respond in this way, they fasten upon themselves the habit of watching for words whose pronunciation they are not sure of, or they form the habit of mentally reproducing the sounds of the syllables, thus establishing the practice of moving the lips and other speech organs when reading silently. Frequently both these habits fix themselves upon children whose reading is judged mainly by the daily oral performance. When either or both habits become fixed a real struggle is required to break them. Unless they are broken, however, the child suffers a severe handicap the rest of his reading life. Many men and women of mature years are still paying the price of those habits fixed in youth. They read but little faster silently than they can pronounce the words orally, because their speech organs make all the motions of the successive words as the reading proceeds.

To be on guard against these two habits care must be exercised from the very beginning. Children in the primary grades should have exercises from the start in which the meaning is the only significant element, and the response is not in terms of words said, but things done or interpretations made. For example, let it be the usual thing for the child to carry out the directions contained in the word or sentence. The primary teacher should be supplied with some hundreds of cards upon which such sentences or short paragraphs as the following are printed or written:

(1) Draw a picture of a flag on the blackboard.
(2) Make a sound like a cross kitty makes when a dog chases her.
(3) Hide behind the door.
(4) Play that you are carrying a cup full of water and do not wish to spill any of it.

These cards should be graded in such a way that certain ones will contain only the words taught in the first reading lessons. As more words are learned, more cards will become available. Word drills should then divide time very generously with this practice in giving attention to meaning. Let the children take turns in directing the exercise. The leader will read silently the first card, then pass it to a member of the class. That member must do exactly what the card says or be corrected by the leader. The second card will be passed to another child, and so on as rapidly as the leader can be sure of his own comprehension. In case the primary class is large it may be divided up into groups of four or five children and a leader be chosen for each group; then the work may proceed simultaneously in all the groups. Many cards may be made with only slight changes. For example, the first illustration might be made to read, Draw a picture of a house on the blackboard; or, Draw a picture of a flag on your tablet.

Variety in handling the exercises may be introduced in scores of ways which will readily occur to a resourceful primary teacher. Many other devices having the same aim will also occur to the teacher. The all-essential thing is that practice in translating written or printed language into action instead of words should be started early, thus producing the habit of advancing through a paragraph by thought units rather than by letters, syllables or words. This will also decrease the likelihood of a lip-reading habit.

In grades above the primary the problem is fundamentally the same as stated for the primary, but the devices must vary. The primary grades devote themselves mainly to acquiring a working knowledge of the tools of learning, such as reading, writing, numbers and language, while the intermediate grades devote themselves to the acquisition of skill in handling the tools of learning through using these tools in doing interesting and worthwhile things. The grades above the intermediate, on the other hand, devote themselves to the acquisition of worth-while information and other life values with any increase in skill in the tools of learning being merely incidental. In other words, the criteria determining both subject matter and method changes rather radically at about the close of the third grade, and again at about the close of the sixth grade. In the primary grades the question is, How can I give the largest working knowledge of the tools of learning? In the intermediate grades the question is, How can I give the most practice with these tools of learning while at the same time the children are doing things interesting and worth while? In the years beyond the intermediate grades the question is, How can I help most to produce efficient citizens, taking advantage to the utmost of the skill these pupils now possess in the tools of learning?

From this statement it will be clear that the devices for gaining skill in silent reading which are appropriate for primary will not do for intermediate grades. Sentence cards which have no other object than to offer opportunity to show the child's comprehension of the language are all right where the object is the acquisition of knowledge of the tools; but in the intermediate grades, where the aim is to develop skill through use of the tools, this use must be in connection with something which is in itself worth while. Otherwise we are laying a false foundation for the later building which is to be erected in the upper grades. Therefore, when a teacher finds her class in fourth, fifth or sixth grade low in silent reading she must find some need for the various members of her class to read silently. Comprehension must be the test, and not word saying. The following may be suggestive of methods and devices leading to this end:

First. Whenever reading is done orally, be sure that what the child is reading is new to most of his listeners. Be sure, too, that the other pupils are listening and not following along with the reader in another copy of the same book. No method of reading is more faulty in intermediate grades than that in which other members of the class are watching for a word error of the reader, ready to call attention at once to such mechanical mistake. This method centers the attention of the reader constantly upon the mechanics and never develops the habit of attending first to the thought. Whereas, if the reader realizes that his hearers know nothing of the content of his selection except what they gather from his reading, then giving the thought instead of pronouncing the words becomes the controlling factor in

his consciousness. It follows from this that only selections the thoughts in which are vital to children should be used as subject matter for such reading. Then let the one who has read such a selection defend the selection against questions or criticisms of the class. In short, center attention upon the meaning, even at the expense, if necessary, of accuracy in pronunciation, enunciation and expression.

Second. Let the amount of reading which is compellingly interesting be increased. Supplementary reading in geography, history, science and literature should be given a larger place. Require that the reports made upon such readings be rather exact, but let the selections be reasonably easy for the children. Gain in facility in silent reading can not be secured by holding the children to selections which are so difficult that word troubles absorb all the attention. One must be able to go with ease through the successive thoughts before the habit of attending to the thought can be acquired.

Third. Make all the industrial and playground exercises give a far greater measure of service in teaching reading than they now commonly give. How singularly shortsighted we are to ask a child to follow the directions printed in his arithmetic for finding the per cent that one number is of another, but employ a teacher to give orally the directions for playing a new game, making a rafia basket or planting beans. The very things which come nearest the natural interest of the children concerning which they would most zealously read if they had the paragraphs containing the needed directions, are given to them orally. When interesting school exercises require a careful following of directions, then those directions make the most effective silent reading material. But in practice we seldom make use of them. This fault is due to a failure to understand the distinction between the aim of the intermediate grades and the aim of the upper grades. If we realized that all the work of the intermediate grades should be made to develop skill in using the tools of learning, then we should not conduct these exercises without making them aid in teaching reading. If skill in gardening or basket weaving or sewing were the ends sought, then they should not be introduced until the grades above the intermediate. If, however, we are using children's interests in these things as motive power with which the children are to gain skill with the tools of learning, then we shall make a maximum of use of the tools in connection with these interesting things. Manual training work in intermediate grades would often be more educative than it is if the teachers of manual training were dumb and had to require the children to study out for themselves from printed directions how to proceed with the various steps of their interesting manual training tasks.

Fourth. Mental arithmetic should seldom be oral. Few opportunities for concentrated attention to the thought of a paragraph are equal to that presented in problems requiring no pencil to solve. Teachers get only half the educative value from such problems if they stand before the class and read them aloud. To read such problems should be a part of the child's task.

Passing now to the situation presented when a class above intermediate grades is found to be low, we have the most serious task of all. The junior high school or upper grade pupil should be able to proceed with his school tasks without much attention to the tools he is using. It is not the primary function of this department to increase the children's facility in the handling of these tools. However, success in all the tasks undertaken in the upper

grades depends upon the skill which the children are expected to possess in the tool subjects. A compromise is therefore necessary if children in the junior high school or seventh and eighth grades are found deficient in their ability to read silently. A few suggestions are here offered in the hope that some help may come from them, although it is realized that correcting reading faults at this stage is very difficult.

First. The voice of the upper grade teacher should be heard in the councils where plans for the course of study are made. The function of each division of the school should be made clear and the responsibility for fulfilling their functions should be laid upon the primary and the intermediate departments in order that the upper grades may be enabled to perform their function. If the present movement in education in the direction of motivating school work comes to mean giving the children in intermediate grades more things which will not require use of the tools of learning to get, then the movement is bound to place a handicap on all education beyond the intermediate grades. If, for example, science is going to be introduced as a series of interesting experiments which the children will perform in ways outlined by the teacher, then the greatest value in science teaching in intermediate grades is missed. If science problems or experiments cannot be the motive for doing much reading, writing, figuring, and talking by the children, then science cannot justify itself in the intermediate grades. The method of using science primarily as a discoverer of truth must be reserved for the grades beyond the intermediate.

When this point is established in the minds of those responsible for the course of study, then the upper grade teacher may feel safeguarded against a continual recurrence of low reading ability in the classes which come to her from year to year.

Second. The upper grade teacher may be able to do something to raise the low average of silent reading ability of his pupils. In the first place, the teacher should discover, if possible, the cause of the low ability. Has the class bad habits of reading, such as forming the words with the speech organs, or moving the eye forward along the printed line by small units such as the syllable or word? Or do the children seem to have their attention fixed upon the mechanics of oral reading so that the thought escapes them? Or does the class show simply lack of sufficient practice in reading silently?

If the cause can be discovered, the teacher can well afford to devote a good deal of time to its removal. First of all, the children's own conscious efforts should be obtained in the direction of correcting the fault. Then, too, the teacher should see that she is observing the same fundamental principles stated for the intermediate grades. Comprehension, and not mechanics, must be made the test of all reading whether in history, science or literature. The material selected for use must be sufficiently easy so that the children are not tied up in word or language difficulties. Again, to overcome the habit of proceeding by too small units, practice must be afforded in advancing by short sentences or phrases. One of the most fruitful devices for giving this practice is to have the pupil take some rather easy selection containing mostly short sentences, and advance literally sentence by sentence. Look at a sentence long enough to grasp it, then look away from the page and repeat the sentence either orally or silently. Proceed to the next sentence in the same way, and so on. If the pupil becomes interested in correcting his

fault, he will practice this device until he does not need to repeat the words, either orally of silently, but needs only to hesitate after each sentence to fix attention upon its meaning and then proceed to the next. The only object of such a device is to fix attention upon thought units, and take it away from smaller units. Where the situation is serious enough to warrant a still more elementary device, perception cards containing sentences of varying difficulty might be secured and flashed before the class in rapid succession so as to require seeing the sentence as a unit. Another exercise which is designed to fix attention upon thought units is simple dramatization. If upper-grade children are given exercise in dialogue selections, not committing the lines to memory but conveying the thought in their own words after looking over the speeches but once or twice, they learn to center the attention upon thought units.

In case the trouble seems to be that the children read fluently enough orally but get little of the thought, introduce a great deal of the sort of reading requiring close attention to the thought. For example, use rule books for football, basket ball, and the like for those interested in games; catalog descriptions; directions for making certain stitches; the more involved arithmetic problems, and so on. These things possess a minimum of word difficulty and a maximum of thought-difficulty. They require the imagination to construct a picture little by little and hold it up for constant modification as the reading proceeds. Thus, attention is focused on thought.

Where the class appears to have the right habits of reading silently and has had insufficient practice, the obvious suggestion is to give them all the practice possible. Much supplementary reading upon which they make only meager reports, if any, will help. Try to secure as much general home reading as possible. See that an abundance of interesting things are available for reading and stimulate interest in them by having children's criticisms of them given before the class.

WHERE VARIABILITY IS TOO WIDE.

We come now to the situation where the range of ability within a class group is too wide. Here the problem is a different one from that presented by a class with a low average ability. Here different treatment is needed by the different members of the class.

It is in this situation that a teacher needs to keep the diagnosis of the abilities of his class graphically before him. Each part of the day's work must call for exercise on the part of each child in those particular skills most needing development. No other service of scientific measurement in education promises more for the future than just this.

Uniformity in instruction for all the members of a class widens variability among them, making the weak ones weaker and the strong ones stronger. To prevent this widening variability more attention must be given to individual instruction. By careful diagnosis including the use of a series of standardized tests, a teacher may picture clearly the needs of each member of her class and adapt her instruction to those needs. This will mean the breaking up of the lock step system and a substitution for it of much individual instruction. This does not tend to a leveling of all members of a class, but to affording a maximum of opportunity to each member to do those things most needful to him. Those things which he can already do well he is not required to do, even though some other members of the class

need them. Reclassification of the school is sometimes suggested by the results of the tests, certain pupils being found too weak for their grade in practically all subjects, while others are found sufficiently strong to do the work of the class ahead. On the whole, however, the results of the diagnosis reveal that pupils who need to give less attention to one subject need to give more attention to some other subject, or, if strong in phase of a subject, they are not so strong in some other phase. In short, the greatest value of the tests is the forceful realization they bring to a teacher that her group is a most variable assortment, demanding for its proper education a minimum of class instruction and a maximum of attention to these individual differences. By modifying her procedure to this end, she will, without intention of so doing, reduce variability among the members of her class.

Those children falling far below the median of the class should be given special physical examination to discover the cause. Sometimes eyesight is found to be poor. Frequently some other physical defect has prevented normal mental growth. Sometimes an examination by means of approved intelligence tests, such as the Binet-Simon tests, reveals that the child is mentally incapable of doing work of the regular school type. If, however, the child is found nearly normal physically and mentally, but has not developed ability to get thought from printed language, he presents a problem in instruction calling for the best professional skill to solve. The writer does not hope to offer any solution which will work in all cases. The following suggestions may help:

First, Make use of the devices suggested for raising the general average of ability in silent reading given in earlier sections of this article. They can be used with the pupils who are below standard while the other members of the class have other assignments.

Second, It is quite certain that a pupil far below the median in this basic ability has never made use of printed language to secure help in satisfying his own childish desires. If possible, situations must be brought about in which his desires or plans depend for their fulfillment upon his reading. It may be, for example, that his mother or father has been in the habit of reading stories to him. If so, and he can be made to be keenly interested in a story by having a part of it read to him, he should have to read the rest himself to satisfy his desire to know the rest of the story. Possibly he would like to be the leader in an occasional nature-study excursion, but, of course, it will be expected that he look up information concerning the things they see on the trip and be able to report later to the group. That is the business of the leader. Or, he might umpire the baseball game if he made sure of the rules; or assign the parts in the coming school entertainment, if he read the various parts carefully so as to be able to make a wise assignment; or score the class compositions on the basis of which was most interesting. Such a list of possible opportunities for calling into service a child's silent-reading ability might be extended. The two things to guard against are (1) making reading a punishment and (2) confusing child need with school need. The thing to be accomplished is to give the child a chance to do something which he really wishes to do, but can't without reading.

Third, See to it that the regular work assigned to him in the school subjects is not too difficult. Skill in silent reading is developed in early years by reading widely in relatively easy matter rather than from reading intensively

a very small volume. The very slow reader is usually one who has never caught the knack of disregarding words and attending to thought. In order to acquire this knack it is necessary to have easy reading. Therefore, while the class is studying a text in history, let the slow reader be assigned some early biographical story bearing upon the events studied.

Little need be said concerning the proper treatment of those individuals at the other extreme of the scale. It is certainly not the object of the teacher to decrease this ability. Simply see to it that, in developing in this particular line, something equally valuable is not being sacrificed. Possibly the children who can read so readily are satiating themselves with reading material unworthy of their ability. Because they love to read, they read "everything." Of course, "everything" usually means very little of that which requires a reader to go slowly through it. "What to read" now takes the place of "how to read" as a problem for the teacher.

Let me say in conclusion that the chief aim both of the tests themselves and of this discussion shall have been attained if they serve to advance the conviction that there is a real problem of teaching silent reading, distinct from the problem of oral reading. If the conviction once gets hold of the teachers, the problem is half solved.

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Vol. VI NEW SERIES No. 7

KANSAS

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EMPORIA

SECOND AND THIRD ANNUAL REPORTS

OF THE

BUREAU OF EDUCATIONAL MEASUREMENTS AND STANDARDS

1915-'16 and 1916-'17

WALTER S. MONROE, Ph. D.,
Professor of School Administration, and Director of the Bureau of Educational Measurements and Standards,
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INTRODUCTORY STATEMENT.

This monograph consists of a report of one phase of the work which has been carried on by the Bureau of Educational Measurements and Standards during the two years 1915-'16 and 1916-'17. In addition to the work reported in this monograph, certain special problems have been studied. These will be reported upon at some future time.

The chapter on handwriting was prepared by J. C. DeVoss, associate professor of psychology and philosophy. The remaining part was prepared by the Director of the Bureau of Educational Measurements and Standards.

WALTER S. MONROE,
Director of Bureau.

JULY 26, 1917.

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CHAPTER I.

A GENERAL STATEMENT.

It was our intention to issue an annual report giving an account of the work of the Bureau of Educational Measurements and Standards for 1915-'16. A number of factors have combined to prevent the publication of the report during the school year, and it is now thought wise to include in this bulletin a report of the work for 1916-'17 in so far as it is possible at the time when this manuscript is sent to the printer. Reports from those cities giving the tests in May, 1917, are not available, neither is it possible to report at this time upon a timed sentence spelling test or upon the derivation of a new silent-reading test. These will be reported at some future time.

This report, as well as much of the other work of the Bureau of Educational Measurements and Standards, is made possible by the coöperation of the superintendents and teachers of Kansas and in few cases of adjoining states. It is a pleasure to acknowledge our indebtedness for this coöperation.

During the year 1914-'15 the work of the Bureau of Educational Measurements and Standards consisted of two undertakings: first, of the supervision of the giving of the Courtis Standard Research Tests in Arithmetic, Series B, in 42 cities[1]; second, the coöperation of forty superintendents in the derivation of the Kansas Silent Reading Tests.[2] As a result of the enthusiastic coöperation of the superintendents and teachers of the state in these two undertakings, those directing the activities of the Bureau of Educational Measurements and Standards believed that an enlargement of the activities of the bureau would be welcomed.

The bureau undertook the publication and distribution of the Kansas Silent Reading Test. It also secured permission and published the Visual Vocabulary Tests devised by Prof. E. L. Thorndike. Later in the school year the publication of the Standard Research Tests in Algebra, devised by Walter S. Monroe, was undertaken. In addition the following tests published elsewhere were made available for distribution: Ayres' Spelling Scale, Ayres' Handwriting Scale, Freeman's Handwriting Scale, The Harvard-Newton Composition Scale, and the Thorndike Drawing Scale.

With the exception of the tests published by Mr. Courtis and the Kansas Silent Reading Tests, the authors of the above tests and scales had not provided directions for using them and record sheets and directions for tabulating the scores obtained. It was therefore necessary for these necessary accessories to be devised and provided if teachers could be expected to use them. The directions and record sheets provided are given

1. Walter S. Monroe, The Use of the Courtis Standard Research Tests in Arithmetic in Twenty-four Cities. Study No. 4, Bureau of Educational Measurements and Standards. Of the forty-two cities giving the test, only twenty-four reported their scores.

2. F. J. Kelly, The Kansas Silent Reading Tests, Bulletin No. 3 of the Bureau of Educational Measurements and Standards.

in the following pages in the section of the report which deals with the results of using the respective tests and scales.

The results of our efforts have been very gratifying indeed. During the year 1915-'16 testing material in one or more subjects was purchased by superintendents in 138 cities in Kansas. These were distributed as follows: First-class cities, 10; second-class cities, 42; third-class cities, 86. The material distributed was sufficient for making 221,098 separate educational measurements. In addition to purchases of material by city superintendents, a few county superintendents purchased material, and during the summer of 1916 there was a surprisingly large number of calls for testing material to be used in connection with teacher's institutes. During the year 1916-'17 a somewhat larger number of Kansas cities have made use of educational tests. There has also been a very large number of calls for information concerning the tests from teachers who were attending county institutes.

It has also been very gratifying that superintendents and teachers beyond the boundaries of the state of Kansas welcomed the opportunity to avail themselves of the services of the Bureau of Educational Measurements and Standards. The Kansas Silent Reading Tests have been used very widely. During the years 1915-'16 and 1916-'17 over 700,000 copies have been used. In addition to the orders for Kansas Silent Reading Tests, there has been a considerable number of calls for other tests and scales. Superintendents and teachers soon realized the value of directions and tabulation sheets for the use of the tests and scales.

During the year 1915-'16 the efforts of the Bureau of Educational Measurements and Standards were focused upon making the superintendents and teachers of the state acquainted with the inadequacy of ordinary tests and examinations for the purpose of measurement and of the need of accurate and systematic measurement of the abilities of pupils. It was, however, recognized that the use of testing material is only the first step. If tests and scales are to be more than mere playthings, the superintendents and teachers must use the information which is obtained to make more effective the teacher's instructional efforts.

It was planned that during the year 1916-'17 the efforts of the Bureau of Educational Measurements and Standards should be concerned with acquainting the teachers with how they might use the information which they were obtaining from the use of tests and scales. Because of unforseen happenings, which do not need to be mentioned here, the plans have been very imperfectly realized.

Standardized tests and scales are of service to the teacher: First, by providing her with a detailed and definite aim; second, by providing her with a diagnosis of the teaching situation with which she is confronted.

Standardized tests and scales are of service to the superintendent: First, by making possible for him to give more definite specification to his teachers; second, by providing him with a measure of results which are being obtained in his school; third, by revealing the nature of the organization of his plan of instruction.

For generations teachers have been attempting to fit the instruction to what they conceived to be the nature of children. In this connection the

use of standardized tests and scales has contributed to the idea that children differ very widely in the kind and the amount of instruction which is necessary to engender in them a desired outcome, and that the instruction should be adjusted so that each child will receive the kind and amount of instruction which he needs. The pupil who learns to write at a satisfactory rate and with a satisfactory legibility does not need handwriting drills which are necessary for those pupils who have not yet attained the standard. His time can be spent more profitably upon arithmetic, reading or spelling, if he is below standard in these subjects; or if he is up to standard in these, upon history, geography, science, etc.

Elaborate teaching devices have been devised which are based upon this idea. It appears, however, that the most important thing is for the teacher to embody this idea in her thinking about her teaching. In planning her assignments and recitations the teacher should keep in mind that the subject matter which she is using is merely a means to an end. The desired end is an outcome of the use of this subject matter, and the subject matter is merely useful for this purpose. The teacher should also recognize that striking individual differences exist in the pupils under her instruction. At all times she will find it necessary to adjust the amount of subject matter, and in some cases the particular items of subject matter as well as the particular way in which the subject matter is used, to the needs of her pupils. She must realize that the subject matter is to be used only to attain certain ends, and that when these ends are attained no further use should be attempted. If the use of the subject matter is continued the time is largely wasted.

The use of standardized tests and scales attempts to engender in teachers this type of thinking, and it is believed that this type of thinking is fundamental to the efficient conduct of our schools.

CHAPTER II.

ARITHMETIC.

The tests upon which this report is based are the well-known Standard Research Tests in Arithmetic, Series B, devised by S. A. Courtis. This series consists of four tests—one test for each of the four operations. The examples of each test are approximately equal to each other in difficulty; that is, example 1 in the addition test is equal in difficulty to example 5 or 8 or any other example of this test. However, the examples of the addition tests are not equal in difficulty to the examples of the subtraction test or the multiplication test. A printed copy of each test was given to each pupil so that the pupils' efforts were directed entirely to the doing of the examples. The type of examples and the time allowance for each test are as follows:

TEST NO. 1.—*Addition.*

Of the twenty-four examples in addition, constituting this test, this is a sample:

927
379
756
837
924
110
854
965
344

Time allowance, 8 minutes.

TEST NO. 2.—*Subtraction.*

Of the twenty-four examples in subtraction, constituting this test, this is a sample:

107795491
77197029

Time allowance, 4 minutes.

TEST NO. 3.—*Multiplication.*

Of the twenty-four examples in multiplication, constituting this test, this is a sample:

8246
29

Time allowance, 6 minutes.

TEST NO. 4.—*Division.*

Of the twenty-four examples in division, constituting this test, this is a sample:

$49\overline{)28420}$

Time allowance, 8 minutes.

These tests, which are commonly known as Series B, were devised in June, 1912. In a recent report Courtis states over 400,000 copies were used in 1914-'15 and over 500,000 in 1915-'16.[1]

In Kansas the tests were given in twenty-four cities in 1914-'15 which reported their scores to the Bureau of Educational Measurements and Standards. The present report is based upon the scores of the twenty-five cities which gave the tests in 1915-'16 and which reported their scores to the Bureau of Educational Measurements and Standards. Of the cities which gave the tests in 1914-'15, nine reported scores in 1915-'16. The cities giving the tests in 1915-'16 are as follows:

FIRST CLASS.	
Leavenworth.	Topeka.
Parsons.	
SECOND CLASS.	
Chanute.	Norton.
Clay Center.	Ottawa.
Fredonia.	Sabetha.
Marion.	Seneca.
Marysville.	Wellington.
Neodesha.	Winfield.
THIRD CLASS.	
Chase.	Natoma.
Claflin.	Peabody.
Ellsworth.	Spearville.
Greenleaf.	Turon.
Medicine Lodge.	Valley Falls.

During the year 1915-'16 no attempt was made to have the tests given at fixed dates, and consequently they were given at various times, but with a very few exceptions the tests were given either at the close of the school year or just prior to the close of the first half of the school year. In practically all of the cities where the tests were given near the close of the first half of the school year, promotions are made at mid-year. Thus it is probable that no significant error will be made by considering the scores to represent the abilities of pupils completing the work of the several grades.

In all cases the tests were given by the local superintendent or some one acting under his direction. In a few cases the tests were given by the classroom teacher. Also the papers were scored and the results tabulated by the superintendent or some one acting under his direction. The calculation of the medians for each city was made by the Bureau of Educational Measurements and Standards.

Strictly speaking, a score is not a measure of a pupil's ability. A score represents only a pupil's performance at a given time under given conditions. Any change of conditions will produce corresponding changes in his performance. Conditions include such things as the time allowance, physical conditions, temperature, humidity, lighting, and the emotional status of the pupil. In general it is probable that standard conditions have prevailed in the giving of the tests, but in the case of particular pupils it no doubt has happened that conditions were not standard. Possibly the pupil's own physical condition was not standard, or his

1. S. A. Courtis, Third, Fourth and Fifth Annual Accountings, 1913-'16. Bulletin No. 4.

pencil point may have broken, or his emotional status may have not been standard, or he may not have possessed at this particular time his normal mental alertness.

The presence of many of the standard conditions depend upon the examiner, and it may have happened that certain examiners produced conditions which materially affect the scores of the pupils whom they tested. They may have done this by urging the pupils to work rapidly in giving the directions for the test or by suggesting to the pupils that they were in competition with pupils in other schools. It may be that some examiners, because they felt rather excited themselves, made the pupils unduly excited.

Performance, therefore, is subject to wide variations. Ability can not be measured. It can be inferred accurately from performance only when we knew of the conditions attending the performance. We may assume that standard conditions prevailed, but in making inferences regarding the ability of particular pupils or particular classes, the fact of this assumption must not be forgotten.

The pupil's ability is dependent upon the training which he has received and upon his native equipment. This native equipment has been called "capacity" by Courtis. Psychologists have frequently referred to it as "native ability." In this bulletin the word "ability" will be used to denote the resultant of training the pupil's native equipment or capacity. To avoid awkwardness of statement, we shall generally speak of scores as representing or measuring ability, but the reader should keep in mind always that ability can only be inferred from scores. Scores represent performances or achievement under the conditions which exist. These probably were approximately standard, but not necessarily so.

Throughout this report "speed" means the number of examples done in a specified interval of time. In the case of the addition tests, this interval is eight minutes; for subtraction, it is four minutes; for multiplication, it is six minutes; and for division, it is eight minutes.

Accuracy means the per cent of examples which were done entirely correctly. An example is not considered right unless it is completely right.

In Tables I to V the median scores[2] for both speed and accuracy are given for the several cities. The cities are grouped by classes. First-class cities are those having a population of 15,000 or over. Second-class cities are those having a population between 15,000 and 1500. Third-class cities are those having a population less than 1500. Table I is read as follows: City No. XX gave the test in November, 1915. The fourth-grade median scores for speed in addition, subtraction, multiplication and division were 4.6, 4.8, 3.7, and 3.2, respectively. The median scores for accuracy are given in the same order. The total medians for first-class cities are given in the fourth line of the table.

This table may be used by the superintendent of any of the cities listed here to determine the relative standing of his city in respect to these tests. The medians may be used by superintendents of other cities as comparative data for interpreting their scores. In interpreting the

2. The median scores is a mid-measure. It is a score such that there are half of the scores for the city or class below it and half above it.

scores it is well to bear in mind the time of year when the tests were given.

A number of interesting observations may be made from these tables. In the first place there are surprisingly large variations in the scores for each grade in the different cities. In this connection, Courtis has given the following warning:

"Comparisons from city to city are to be made with extreme caution. Not only are results affected by the personality of the examiner, by the conditions under which the tests are given, by the care used in scoring and tabulating, but many other factors influence scores. In some cities every school and child have been tested; in other cities only certain selected schools. Some of the results represent achievements after repeated tests during several years; other scores are returns from the first test ever given. Some cities have nine grades in the elementary school, some but seven.

"Every one should take pains to give and score the tests *under standard conditions*, but at best one should expect to get from city-to-city comparisons only conclusions as to the nature and amount of *relative progress* and not judgments as to absolute achievements."[3]

However, after making due allowance for this caution, the amount of variation is still surprisingly large. For example, a comparison of the fourth-grade median scores for the first-class cities shows that City XX has very much lower medians than the other two cities. This suggests marked differences in aim in the teaching of arithmetic in the fourth grade in these cities. The same hypothesis is suggested by the median scores for the other groups of cities. Differences in aim have a very important bearing upon the efficiency of the organization of the school system. It may be that the highest type of efficiency is represented by the school system which develops arithmetical abilities early in the course of the child's education. If this plan represents the highest type of efficiency, then to delay the development of arithmetical ability is to place a decided handicap upon the pupil's work in the later grades. It is relatively easy to secure high scores in the fourth and fifth grades by stressing the operations of arithmetic in these and the earlier grades, but this is necessarily done at the expense of other school subjects and should not be done unless it is certain that doing so makes for efficiency.

Even in the eighth grade we find wide variations in scores. Since the scores of this grade represent the achievement of pupils who are completing the work of the elementary school, it seems wise that superintendents and teachers of those cities having extreme median scores should seriously question the appropriateness of their aims. It should be obvious that the most efficient practice cannot maintain in all of the cities. If those cities which have the highest scores are most efficient, then those whose scores are conspicuously lower cannot represent an efficient practice. On the other hand, if those cities whose scores are lowest represent the more efficient practice, then those cities whose scores are highest are placing too much emphasis upon the operations of arithmetic. This means that pupils are being asked to use their time in ways that are not the most profitable.

3. S. A. Courtis, *loc. cit.* page 57.

As yet we do not have standards which have been scientifically determined so that we may know what scores represent the most efficient practices. A scientific determination of standard scores must be based upon two factors: First, they must be high enough so that a pupil will be able to do efficiently those things which involve arithmetical calculation which he will meet outside of school; second, the pupil must possess a sufficient ability to perform the fundamental operations of arithmetic so that he will not consume an undue amount of time in solving arithmetical problems in school. For the solving of these problems in school it seems reasonable to say that the pupil does not need to possess the same degree of ability as an expert accountant, but unless he does possess ability to perform the operations at a reasonable rate and with fair accuracy the amount of time required for the doing of problems will be unduly large. For a more complete discussion of this point, see "Educational Tests and Measurements," Walter S. Monroe, chapter 9 (Houghton, Mifflin Co.).

Comparisons also can be made between the three classes of cities. The median scores of no one class of cities are conspicuously higher than those of the other two classes. However, the median scores of the second-class cities are highest in the fourth, fifth and eighth grades. In the sixth and seventh grades the median scores of the first-class cities are highest. This supremacy is not sufficiently marked to be particularly significant. In Iowa, after making a similar study, the conclusion was reached that the size of the city was not a determining factor in the achievement of pupils in these operations of arithmetic.[4]

In Table VI the median scores for Kansas, Indiana, Iowa, Minnesota and Boston are given together, with the general medians and the standards proposed by Courtis. The Iowa medians are for tests given in May, 1916, in fifty-two Iowa cities.[5] The Indiana medians are based on tests given in May, 1915, in twenty-two Indiana cities.[6] The Minnesota medians are based upon tests given in sixteen Minnesota cities in May, 1916.[7] The general medians were derived by Courtis[8] from tabulations made from a series of reports to him from 1913-'16. The distributions for each grade included approximately equal numbers from large city schools and from small city and county schools. The Courtis Standards were set by Courtis after making these tabulations, and represent his best judgment after three years' use of the test. In Figure 1 the median number of examples attempted for the states of Kansas, Indiana, Iowa and Minnesota are shown graphically. In Figure 2 the corresponding median scores for the per cent of examples done correctly are shown. In the case of both figures, Kansas scores are represented by the solid line. It is interesting to note that in practically every instance the scores for Iowa exceed those of the other states. On the whole, Kansas ranks second.

4. E. J. Ashbaugh, The Arithmetical Skill of Iowa School Children. University of Iowa, Extension Bulletin No. 24.

5. E. J. Ashbaugh, The Arithmetical Skill of Iowa School Children. University of Iowa, Extension Bulletin No. 24.

6. M. E. Haggerty, Studies in Arithmetic, Indiana University Studies, Study No. 32

7. Taken from an unpublished report by M. E. Haggerty, University of Minnesota Minneapolis, Minn.

8. S. A. Courtis, Third, Fourth and Fifth Annual Accountings, 1913-'16.

FIG. 1.

Showing median number of examples attempted in four states. Kansas, ———; Indiana, - - - -; Iowa, — — —; Minnesota, x x x.

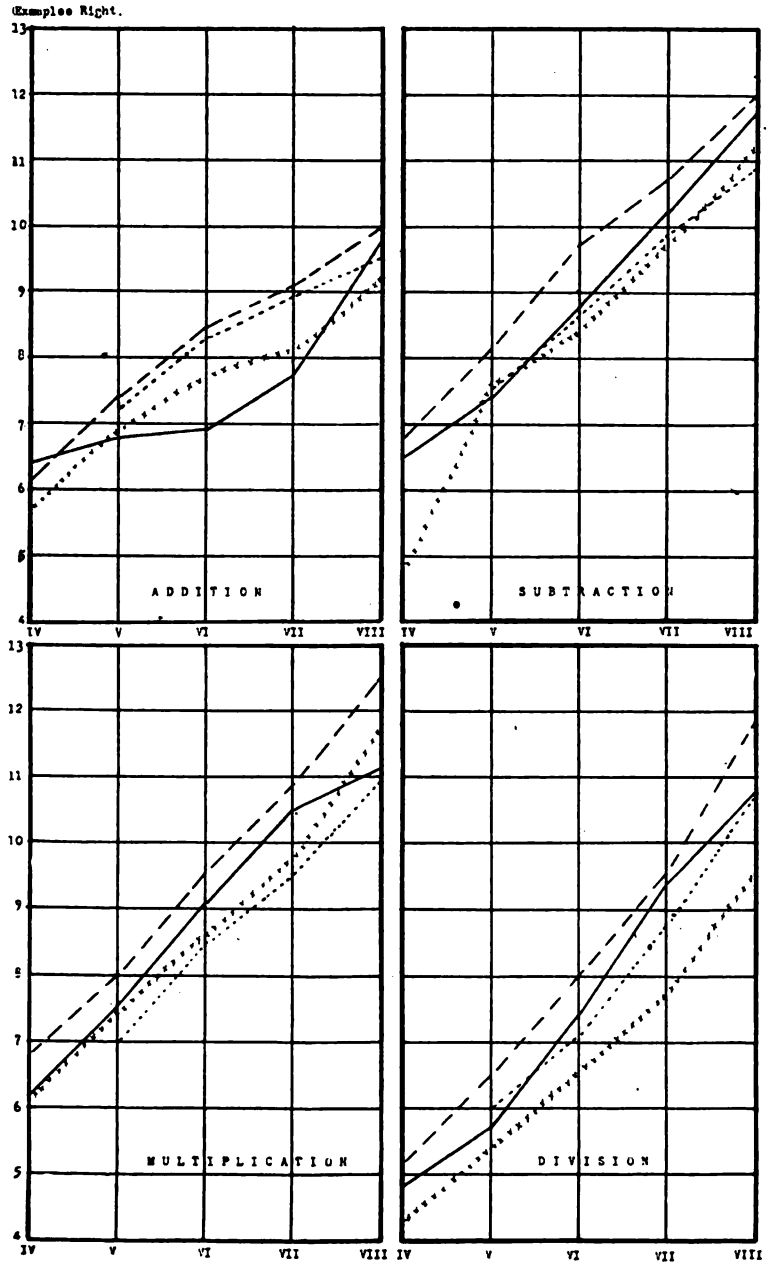
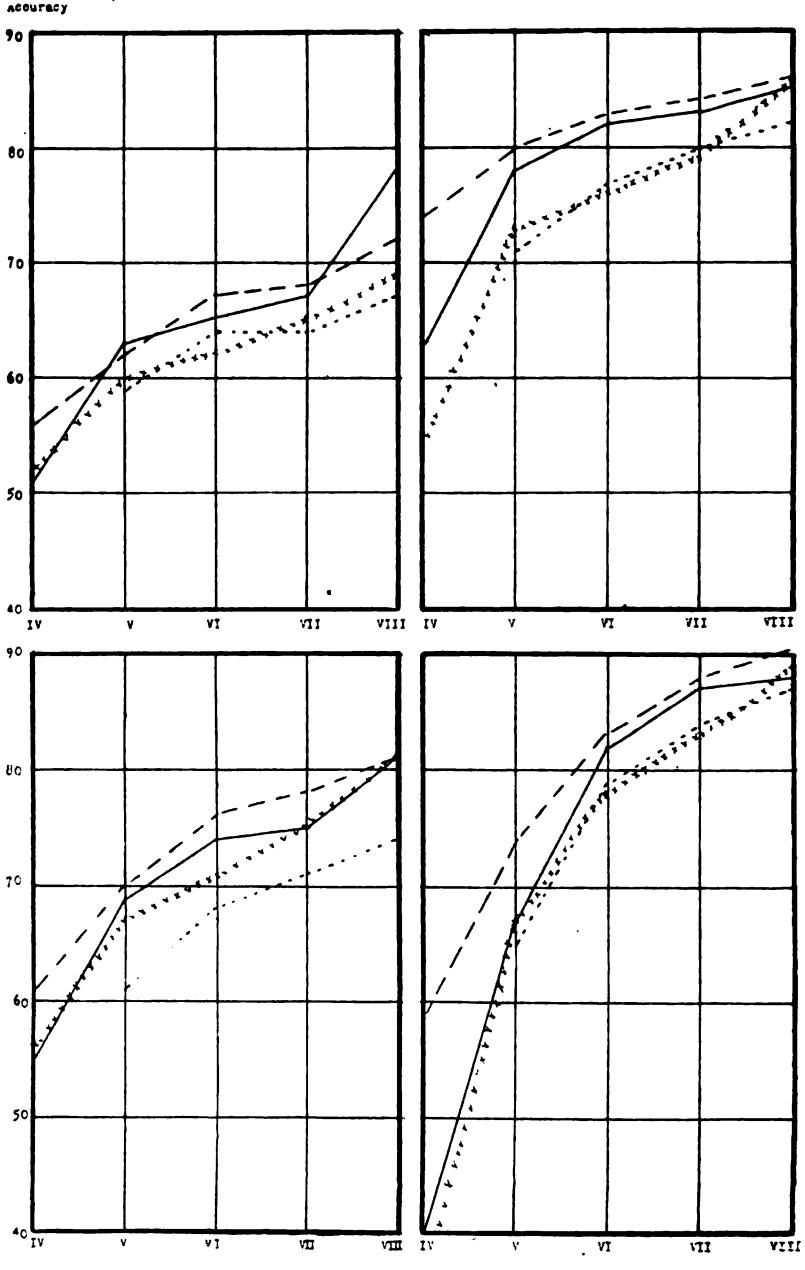


FIG. 2.

Showing median scores in per cent of examples done correctly in four states: Kansas, ————; Indiana, - - - - - - - -; Iowa, — — — — — —; Minnesota, x x x x x x x.



However, it is to be noted that the medians for all states are conspicuously below the general medians and the Boston medians. They are likewise below the standard medians which have been set by Courtis, particularly in the upper grades.

In the case of the number of examples attempted, it should be noted that there is almost as great increase from the seventh to eighth grade as for any other successive grades. In view of the fact that the pupil has many opportunities for using his ability to perform the operations of arithmetic in doing the work of the upper grades, the question may well be raised whether it would not be more efficient to place more emphasis upon the rate of performing the operations in the earlier grades. If this were done, the pupil would be able to make use of his ability in doing the work of the upper grades. As it now is he does not acquire ability to do examples rapidly until nearly the close of his elementary school course. The curves of progress shown in Fig. 1 differ from the corresponding standard curves in the respect which has been mentioned. Furthermore, it should be noted that in the case of addition the median scores for Kansas are particularly unsatisfactory. There is a greater increase in the number of examples attempted from the seventh grade to the eighth grade than from the fourth grade to the seventh grade. If the degree of ability which the eighth-grade pupils have is to be engendered, it seems reasonable that it should be engendered early enough so that the pupils could make use of it in the work of the upper grades.

High medians can be obtained by large expenditures of time and energy upon the operations of arithmetic, but in so doing other school subjects will be neglected. Such practice is not efficient. On the other hand, when scores are all low, pupils are handicapped by not being sufficiently equipped to do the problem work of arithmetic, and in the application of arithmetic in other school subjects. Therefore, the highest degree of efficiency is found somewhere between these two extremes. As yet we do not have an authoritative statement of the most efficient standards, but in view of the median scores which have been attained in Iowa, Boston, and in general, it appears probable that the Kansas medians are somewhat below those which represent the highest degree of efficiency.

In Table VII the median scores are given for those cities which gave the tests in 1914-'15 and in 1915-'16. A study of this table shows that little or no increase has been made in the median scores. In certain cities the scores for 1915-'16 are conspicuously lower than they were the year previous. In others the reverse is true, but in general the change has been very slight and there are approximately as many cases of decrease as of increase. Why this should be true is rather difficult to explain. Much the same condition has been found to exist in both Indiana and Iowa. It has been suggested that perhaps the teachers have approximately reached the limit of their efficiency in teaching arithmetic and that we cannot hope for much improvement of existing conditions.

The median score is not the only index of the efficiency of teaching. The closeness with which the scores are grouped about the median is generally conceded to furnish another measure of the effectiveness of the

organization of the school or of the teaching. It is a well-known fact that wherever these tests have been given to a large number of pupils, the scores have not been grouped closely about the median; and when the distributions for successive grades are compared, a very great overlapping is found. It was thought perhaps that the cities repeating the tests in 1915-'16 might have devoted their attention to reducing the variability of the scores. Accordingly the quartile range, or Q,[9] was calculated. See Table VIII. It was found that in general Q was slightly larger for the 1915-'16 scores than for the 1914-'15 scores. This means that in general the scores were not more closely grouped about the medians; hence it is not possible to explain the failure to increase the median by showing that the efforts of the teachers were devoted to reducing the variability of the scores.

Studies of efficiency in other fields have revealed unexpected sources of waste and have been the basis for greatly increasing the effectiveness of workers. It seems probable to the writer that teachers have not reached the limit of their efficiency, but rather that these facts should be interpreted that teachers as yet have not learned how to make the best use of systematic testing to improve the effectiveness of their instruction.

Tests such as Series B are not teaching devices, neither are they mere playthings. They are instruments to enable the teacher and superintendent to ascertain the status of the ability of pupils. This information should then be used by the teacher and by the superintendent as a basis for increasing the effectiveness of instruction. It may be that instruction can be made more effective by reclassifying the pupils. It may be that certain pupils should be excused from further drill upon certain of the operations and helped to spend their time in more effective ways. It may be that the type of drill now in use is not the best. It may be that certain pupils need help with certain specific difficulties.

Both teachers and superintendents must become students of the teaching situation which exists. Tests can only diagnose. The facts obtained by means of the use of tests must be studied carefully. Upon the basis of the facts, appropriate remedies must be prescribed.

Lack of space forbids a consideration of possible remedial instruction here. Suggestions will be found in the Teacher's Handbook on Educational Measurements published by the Bureau of Educational Measurements and Standards. Additional suggestions will be found in Educational Tests and Measurements, by Walter S. Monroe (Houghton Mifflin Company).

9. "Q" is calculated by first determining the point in the distribution below which there are just one-fourth of the scores. This is called the first quartile or Q1. The third quartile, or Q3, is the point in the distribution below which there are three-fourths of the scores. One-half of the difference between Q3 and Q1 is called Q. In the case of normal distributions Q represents the width of the interval on either side of the median within which fifty per cent of the scores are included. The distributions for these groups are approximately normal, hence it will be approximately correct to attach this meaning to Q.

TABLE I.

City Medians, 1915-'16.—Fourth Grade.

FIRST-CLASS CITIES.

City.	Date.	Speed.				Accuracy.			
		A.	S.	M.	D.	A.	S.	M.	D.
XX	11-15	4.6	4.8	3.7	3.2	42	40	36	32
LXXI	12-15	6.1	6.2	5.4	3.2	59	65	62	66
CX	5-16	6.0	6.2	5.2	4.3	54	64	57	59
Total medians		5.7	5.3	5.1	3.7	53	50	55	40
SECOND-CLASS CITIES.									
V	12-16	5.6	4.9	2.0	3.2	31	33	36	30
XXVII	1-16	6.5	6.3	5.4	4.3	53	57	46	32
XXVII	5-16	7.3	7.7	6.6	5.1	62	80	59	38
XXX	5-16	5.6	6.3	5.7	3.6	52	65	68	52
XXXI	2-16	5.2	5.4	5.0	4.1	55	64	60	100
XXXI	5-16	7.4	7.1	6.6	5.6	65	80	72	100
XXXIII	11-15	5.2	5.6	4.6	3.2	43	54	58	43
XXXIII	5-16	5.2	7.3	5.9	4.8	59	69	66	54
XLI	12-15	4.8	5.6	5.2	3.2	60	73	70	66
LIV	2-16	4.6	4.7	3.9	.....	53	86	56	.....
LVIII	3-16	5.1	5.8	4.4	.....	41	46	53	.....
LXXVI	3-16	6.1	6.3	5.3	3.6	55	63	60	46
LXXXI	4-16	5.4	6.5	3.4	5.0	54	43	36	34
CII	5-16	4.8	6.7	5.0	3.6	52	67	35	33
CXIII	9-15	4.2	3.8	1.1	5.9	55	50	12	52
CXIII	6-16	4.5	4.5	5.7	1.6	47	47	26	10
Total medians		5.3	6.6	5.4	5.1	52	64	56	41
THIRD-CLASS CITIES.									
XIV	1-16	4.6	5.5	5.0	2.7	25	32	32	25
XV	2-16	7.9	7.2	6.8	5.4	42	57	67	62
XXV	5-16	6.7	6.6	5.0	4.0	37	37	60	43
XXVIII	2-16	4.9	4.9	3.5	1.6	36	50	37	33
XXVIII	5-16	5.8	6.0	4.4	3.4	54	66	55	65
XXIX	1-16	3.6	6.6	4.7	4.1	34	39	30	32
XLIX	1-16	5.0	5.5	5.8	2.3	38	55	45	35
LXVII	2-16	5.3	4.6	5.1	2.9	47	34	43	35
CI	4-16	6.0	5.7	5.1	2.5	39	36	39	30
Total medians		5.6	5.8	5.2	3.1	41	40	40	41

TABLE II.

City Medians, 1915-'16.—Fifth Grade.

CITY.	Date.	SPEED.				ACCURACY.			
		A.	S.	M.	D.	A.	S.	M.	D.
FIRST-CLASS CITIES.									
XX	11-15	6.8	6.8	6.2	4.3	62	78	61	56
LXXI	12-15	6.4	7.1	6.5	4.2	63	74	71	63
CX	5-16	6.8	7.6	6.7	4.8	64	78	59	74
Total medians		6.6	7.3	6.5	4.5	63	76	69	66
SECOND-CLASS CITIES.									
V	12-16	7.1	7.0	6.0	4.0	46	63	56	58
XXVII	1-16	8.0	8.1	7.5	5.4	53	83	69	56
XXVII	5-16	8.5	8.3	7.5	6.0	71	84	68	68
XXX	5.16	6.6	7.4	7.2	4.1	59	84	78	82
XXXI	2-16	7.4	8.2	7.1	6.2	63	69	82	89
XXXI	5-16	8.8	9.4	8.7	7.3	74	86	75	99
XXXIII	11-15	6.1	6.8	6.0	4.5	54	69	68	58
XXXIII	5-16	7.6	9.2	7.8	5.2	63	85	82	70
XLI	12-15	6.5	8.0	5.7	3.7	68	76	69	66
LIV	2-16	5.7	6.1	4.3	3.6	51	68	55	52
LVIII	3-16	6.5	7.3	5.8	3.3	65	60	60	56
LXXVI	3-16	7.0	7.6	7.0	4.9	63	76	69	63
LXXXI	4-16	6.0	7.7	6.0	4.0	62	77	70	56
CII	5-16	7.6	8.3	7.0	4.8	62	75	70	74
CXIII	9-15	4.6	4.4	2.9	1.8	49	53	48	56
CXIII	6-16	5.5	8.0	7.6	8.5	53	75	80	90
Total medians		7.3	7.7	6.8	5.6	62	76	71	69
THIRD-CLASS CITIES.									
VII	11-16	5.3	5.6	5.1	3.5	64	76	78	75
XIV	1-16	6.0	5.8	5.0	2.8	36	50	32	36
XV	2-16	7.5	7.1	6.9	5.4	58	68	78	72
XXV	5-16	6.8	8.0	6.6	5.0	49	65	63	74
XXVIII	2-16	6.8	6.8	6.0	4.3	50	65	67	68
XXVIII	5-16	6.3	6.4	7.5	4.0	63	60	60	54
XXIX	1-16	6.2	5.3	3.5	4.0	57	31	50	41
XLIV	2-16	7.5	7.5	7.3	3.0	50	83	60	60
XLIX	1-16	6.0	6.4	5.0	3.3	39	63	55	39
LXVII	2-16	7.8	7.8	6.7	5.0	57	80	74	75
CI	4-16	6.0	8.3	6.0	4.5	41	78	60	53
Total medians		6.6	6.7	6.1	4.3	55	66	64	62

TABLE III.

City Medians, 1915-'16.—Sixth Grade.

City.	Date.	Speed.				Accuracy.			
		A.	S.	M.	D.	A.	S.	M.	D.
FIRST-CLASS CITIES.									
XX	11-15	7.3	7.6	6.6	5.5	68	80	75	78
LXXI	12-15	7.8	8.7	8.7	6.2	74	81	80	87
CX	5-16	8.3	9.3	9.0	7.8	68	80	79	86
Total medians		8.6	8.9	8.1	6.0	69	83	79	83
SECOND-CLASS CITIES.									
V	12-16	7.1	8.0	6.5	4.6	40	60	54	57
XXVII	1-16	9.5	9.5	8.7	7.7	66	85	72	82
XXVII	5-16	8.7	10.1	9.4	8.3	70	87	77	78
XXX	5-16	7.3	8.6	8.4	6.0	65	83	84	85
XXXI	2-16	7.9	9.2	7.7	6.4	66	72	76	88
XXXI	5-16	10.2	10.5	9.0	8.7	79	86	74	94
XXXIII	11-15	7.2	8.3	8.6	6.0	48	66	62	68
XXXIII	5-16	7.1	9.3	7.4	6.7	58	87	73	80
XLI	12-15	6.4	6.8	5.5	5.2	63	76	66	68
LIV	2-16	7.6	7.8	6.6	5.0	42	52	62	72
LVIII	3-16	7.8	8.5	7.0	5.8	59	74	75	79
LXXVI	3-16	8.1	9.3	8.0	7.2	66	81	70	78
LXXXI	4-16	7.6	8.9	9.2	7.0	60	75	74	84
CII	5-16	8.0	9.0	7.3	6.5	71	85	66	84
CXIII	9-15	5.1	6.7	5.6	4.5	58	65	56	67
CXIII	5-16	9.0	9.2	8.0	8.0	76	96	80	90
Total medians		8.7	8.6	7.9	6.6	63	79	72	83
THIRD-CLASS CITIES.									
VII	11-16	6.2	7.5	5.8	4.8	56	84	87	84
XIV	1-16	7.0	8.6	6.7	5.3	50	65	70	86
XV	2-16	9.3	9.3	10.1	10.2	55	62	68	82
XXV	5-16	9.5	10.0	8.3	7.8	57	49	73	80
XXVIII	2-16	7.0	8.4	8.1	8.8	65	71	75	66
XXVIII	5-16	8.5	8.9	8.6	8.0	82	88	85	89
XXIX	1-16	6.3	8.2	7.3	4.4	55	70	71	55
XLIV	2-16	7.0	7.5	7.4	4.3	58	68	75	70
XLIX	1-16	5.0	6.6	5.0	4.4	60	85	70	67
LXVII	2-16	8.2	8.6	7.3	6.6	60	75	67	80
CI	4-16	9.0	11.0	11.0	8.0	55	85	70	70
Total medians		7.6	8.4	7.1	5.8	57	73	74	76

TABLE IV.

City Medians, 1915-'16.—Seventh Grade.

FIRST-CLASS CITIES.

CITY.	Date.	SPEED.				ACCURACY.			
		A.	S.	M.	D.	A.	S.	M.	D.
XX	11-15	8.1	9.7	8 8	7.9	74	79	77	85
LXXI	12-15	8 3	10.2	9.3	7.0	76	87	83	85
CX	5-16	8.8	10.5	9.8	9.0	68	85	80	89
Total medians		8.6	10.3	10.4	8.4	61	85	81	88
SECOND-CLASS CITIES.									
V	12-16	10.0	9.0	9.7	8.3	50	60	62	60
XXVII	1 16	9.2	10.1	9.7	8.5	77	90	76	73
XXVII	5-16	10.8	11.3	11.0	11.0	70	93	82	53
XXX	5-16	8.4	10.0	9.5	7.5	62	78	78	88
XXXI	2-16	8.8	9.7	9.9	7.4	69	73	61	83
XXXI	5-16	12.1	12.5	11.1	11.6	64	81	68	82
XXXIII	11-15								
XXXIII	5-16								
XLI	12-15	6.7	8.8	8.7	6.4	66	88	87	85
LIV	2-16	8.2	8.7	7.7	7.4	68	82	74	81
LVIII	3-16	8.6	9.6	8.5	7.0	62	79	77	87
LXXVI	3-16	9.5	11.0	10.9	9.7	79	84	82	86
LXXXI	4-16	8.5	11.0	3.0	10.0	60	81	77	85
CII	5-16	6.8	8.7	8.3	5.0	41	73	63	73
CXIII	9-15	6.4	7.6	6.7	5.2	58	78	70	75
CXIII	5-16	9.2	10.5	9.0	10.1	68	87	86	98
Total medians		9.3	10.2	9.5	8.3	54	82	73	83
THIRD-CLASS CITIES.									
VII	11-16	5.8	7.2	6.0	6.1	75	86	80	83
XIV	1-16	7.6	10.0	10.2	7.8	42	60	50	77
XV	2-16	8.4	10.2	8.7	7.7	55	77	82	90
XXV	5-16	7.8	11.0	8.0	9.0	55	73	83	100
XXVIII	2-16	7.4	9.3	9.0	6.7	81	90	81	97
XXVIII	5-16	9.3	12.0	11.0	10.0	73	87	81	93
XXIX	1-16	8.4	9.0	8.3	7.5	75	83	73	87
XLIV	2-16	8 8	9.8	9.7	8.0	50	80	70	80
XLIX	1-16	6.0	8.6	8.0	6.3	61	80	80	73
LXVII	2-16	8.5	10.5	8.7	10.0	50	63	63	85
CI	4-16	8.3	12.0	10.0	5.6	60	85	60	85
Total medians		7.7	9.4	8.2	7.6	61	80	76	85

TABLE V.

City Medians, 1915-'16.—Eighth Grade.

FIRST-CLASS CITIES.

CITY.	Date.	SPEED.				ACCURACY.			
		A.	S.	M.	D.	A.	S.	M.	D.
XX	11-15	10.3	7.8	8.7	7.8	85	85	83	84
LXXI	12-15	10.2	8.2	10.6	8.3	71	86	83	86
CX	5-16	11.7	9.8	11.1	10.4	71	87	82	90
Total medians		11.1	9.4	10.6	9.6	73	86	82	89
SECOND-CLASS CITIES.									
V	12-16	8.6	10.4	9.5	8.8	58	75	76	84
XXVII	1-16	12.5	12.9	10.6	9.5	84	84	78	75
XXVII	5-16	13.1	12.7	12.7	10.1	76	90	77	87
XXX	5-16	9.2	11.2	10.6	10.4	89	98	86	100
XXXI	2-16	9.6	10.7	10.8	9.6	73	76	81	95
XXXI	5-16	12.7	13.2	12.3	12.5	75	87	75	87
XXXIII	11-15	.....	.....	.....	.....	.....	.....	.....	.....
XXXIII	5-16	.....	.....	.....	.....	.....	.....	.....	.....
XLI	12-15	8.8	11.0	11.5	8.8	77	98	90	100
LIV	2-16	8.2	9.8	11.4	7.4	68	85	73	83
LVIII	3-16	8.8	10.3	9.6	8.1	70	83	82	88
LXXVI	3-16	10.7	12.4	11.9	12.1	72	89	86	98
LXXXI	4-16	5.7	8.4	10.8	8.0	64	72	63	73
CII	5-16	8.4	9.5	10.1	9.0	75	86	83	100
CXIII	9-15	7.6	8.7	9.3	5.5	60	80	75	70
CXIII	5-16	7.3	11.3	10.3	12.0	63	83	80	90
Total medians		10.7	11.2	11.0	9.9	74	85	84	88
THIRD-CLASS CITIES.									
VII	11-16	.....	.....	.....	.....	.....	.....	.....	.....
XIV	1-16	10.3	12.0	11.0	6.0	50	68	70	83
XV	2-16	10.5	13.2	11.0	11.0	73	83	81	100
XXV	5-16	10.0	14.0	13.0	12.6	55	80	83	95
XXVIII	2-16	9.3	10.5	10.1	8.4	73	83	75	90
XXVIII	5-16	10.2	12.5	12.3	.....	75	86	82	.....
XXIX	1-16	9.5	9.8	9.0	9.0	51	86	65	93
XLIV	2-16	10.3	12.0	11.0	9.0	70	90	95	100
XLIX	1-16	6.3	9.7	10.0	6.8	66	90	75	85
LXVII	2-16	11.0	14.5	12.0	12.0	45	70	72	70
CI	4-16	11.7	16.0	14.5	15.0	90	87	85	100
Total medians		8.0	12.4	10 9	10.5	65	83	78	93

TABLE VI.

State and Standard Median Scores.

	Addition.		Subtraction.		Multiplication.		Division.	
	Speed.	Acc.	Speed.	Acc.	Speed.	Acc.	Speed.	Acc.
FOURTH GRADE.								
Kansas medians	6.4	51	6.5	63	5.2	55	3.8	40
Iowa medians	6.2	56	6.8	74	5.8	61	4.2	59
Minnesota medians	5.7	52	4.8	55	5.2	56	3.3	38
General medians	7.4	64	7.4	80	6.2	67	4.6	57
Courtis standard	6	100	7	100	6	100	4	100
Boston medians	8	70	7	80	6	60	4	60
FIFTH GRADE.								
Kansas medians	6.8	63	7.4	78	6.6	69	4.7	67
Indiana medians	7.2	59	7.5	71	6.0	61	5.0	65
Iowa medians	7.4	62	8.2	80	7.0	70	5.5	74
Minnesota medians	6.9	60	7.6	73	6.5	67	4.4	67
General medians	8.6	70	9.0	83	7.5	75	6.1	77
Courtis standard	8	100	9	100	8	100	6	100
Boston medians	9	70	9	80	7	70	6	70
SIXTH GRADE.								
Kansas medians	6.9	65	8.8	82	8.1	74	6.4	82
Indiana medians	8.3	64	8.7	77	7.5	68	6 1	79
Iowa medians	8.5	67	9.7	83	8.6	76	7.0	83
Minnesota medians	7.7	62	8.4	76	7.6	71	5 6	78
General medians	9.8	73	10.3	85	9.1	78	8.2	87
Courtis standard	10	100	11	100	9	100	8	100
Boston medians	10	70	10	90	9	80	8	80
SEVENTH GRADE.								
Kansas medians	7.7	67	10.2	88	9.5	75	8.4	87
Indiana medians	8.9	64	9.9	80	8.5	71	7.8	84
Iowa medians	9.1	68	10.7	84	9.9	78	8.5	88
Minnesota medians	8.2	65	9.8	79	8.7	75	6.7	83
General medians	10.9	75	11.6	86	10.2	80	9.6	90
Courtis standard	11	100	12	100	10	100	10	100
Boston medians	11	80	11	90	10	80	10	90

TABLE VI—*Concluded.*

EIGHTH GRADE.

	Addition.		Subtraction.		Multiplication.		Division.	
	Speed.	Acc.	Speed.	Acc.	Speed.	Acc.	Speed.	Acc.
Kansas medians	9.8	78	11.7	85	10.2	81	9.8	88
Indiana medians	9.5	67	10.9	82	9.9	74	9.7	87
Iowa medians	10.0	72	12.0	86	11.5	81	10.8	91
Minnesota medians	9.2	69	11.2	86	10.7	81	8.6	89
General medians	11.6	76	12.9	87	11.5	81	10.7	91
Courtis standard	12	100	13	100	11	100	11	100
Boston medians	12	80	12	90	11	80	11	90

TABLE VII.—*City Medians 1914-1915 compared with medians of same cities 1915-1916.*

FOURTH GRADE.

CITY.	Addition.				Subtraction.				Multiplication.				Division.			
	Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.	
	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.
XX	5.4	4.6	51	42	5.7	4.8	54	40	5.0	5.7	59	36	4.2	3.2	49	32
XXVII	7.9	6.5	64	53	8.1	6.3	83	57	6.5	5.4	77	46	4.8	4.3	73	32
XXVIII	5.8	4.9	54	36	6.0	4.9	66	50	4.4	3.5	55	37	3.4	1.6	65	33
XLI	5.8	4.8	56	60	6.2	5.6	67	73	5.1	5.2	57	70	3.3	3.2	52	66
LIV	4.7	4.6	51	54	4.4	4.7	50	86	2.8	3.9	36	56	2.0	.....	31	.....
LVIII	5.5	5.1	74	41	4.2	5.8	41	46	3.6	4.4	44	52	.....	.....	....	.....
LXXVI	5.7	6.1	55	55	6.5	6.3	57	63	5.3	5.3	59	60	4.0	3.6	56	46
CII	6.4	4.8	56	52	7.4	6.7	71	67	6.2	5.0	58	35	4.3	3.6	52	33
CX	5.6	6.0	53	54	6.2	6.2	63	64	5.0	5.2	57	59	3.6	4.3	50	59
Total medians	5.7	5.6	54	51	5.9	5.9	59	59	4.9	4.9	56	52	3.7	3.7	51	43

TABLE VII—CONTINUED.—FIFTH GRADE.

CITY.	Addition.				Subtraction.				Multiplication.				Division.			
	Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.	
	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.
XX	6.5	6.3	49	62	6.6	6.3	67	78	6.6	6.2	82	61	5.1	4.3	69	56
XXVII	8.9	8.0	78	53	9.3	8.1	86	83	8.8	7.5	81	69	7.5	5.4	79	56
XXVIII	6.2	6.8	63	50	6.4	6.6	65	60	7.5	6.0	67	60	4.0	4.3	68	54
XLI	6.2	6.5	61	68	6.7	7.0	83	76	6.8	5.7	64	69	3.5	3.7	58	66
LIV	6.0	5.7	61	51	6.4	6.1	67	68	6.0	4.3	56	55	4.7	3.6	75	52
LVIII	6.0	6.5	51	65	6.0	7.3	54	60	4.9	5.8	44	60	3.6	3.8	48	56
LXXVI	8.2	7.0	63	63	9.0	7.6	77	76	7.3	7.0	73	69	6.0	4.9	79	63
CII	6.5	7.6	64	62	8.0	8.3	81	75	6.8	7.0	68	70	5.3	4.8	80	74
CX	7.0	6.8	61	64	7.7	7.6	76	78	6.5	6.7	69	59	4.6	4.8	66	74
Total medians	6.9	6.8	60	62	7.6	7.1	74	76	7.0	6.3	68	67	4.6	4.6	67	61

TABLE VII—CONTINUED.—SIXTH GRADE.

CITY.	Addition.				Subtraction.				Multiplication.				Division.			
	Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.	
	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.
XX	6.5	7.3	69	68	6.6	7.6	67	80	6.6	6.6	82	75	5.1	5.5	69	78
XXVII	8.9	8.7	61	66	9.3	9.5	83	87	8.8	8.7	64	72	3.5	7.7	58	82
XXVIII	6.3	7.0	63	65	6.4	8.4	65	71	7.5	8.1	67	75	4.0	3.8	68	66
XLI	6.2	6.4	61	63	6.7	6.8	83	76	6.8	5.5	64	66	3.5	5.2	58	68
LIV	6.0	7.6	61	42	6.4	7.8	67	82	6.0	6.6	56	62	4.7	5.0	75	72
LVIII	7.5	7.8	62	59	8.0	8.5	78	74	6.7	7.0	77	75	4.9	5.8	79	79
LXXVI	8.2	8.1	63	66	9.0	9.3	77	81	7.3	8.0	73	70	6.0	7.2	79	78
CII	6.5	8.0	64	71	8.0	9.0	81	85	6.8	7.3	68	66	5.3	6.5	80	84
CX	7.0	8.3	61	68	7.7	9.3	76	80	6.5	9.0	69	79	4.6	7.8	66	86
Total medians	7.9	7.1	71	65	8.8	7.9	81	82	7.8	7.9	79	76	6.3	6.9	84	82

TABLE VII—CONTINUED.—SEVENTH GRADE.

CITY.	Addition.				Subtraction.				Multiplication.				Division.			
	Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.	
	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.
XX	8.3	8.1	61	74	10.1	9.7	69	79	9.9	8.3	72	77	7.9	7.9	85	85
XXVII	9.8	9.2	69	77	11.0	10.1	84	90	9.4	9.7	73	76	8.0	8.5	98	73
XXVIII	9.3	7.4	73	81	12.0	9.3	87	90	11.0	9.0	81	81	10.0	9.7	93	97
XLI	7.8	6.7	60	66	10.0	8.8	82	88	10.3	8.7	83	87	8.3	6.4	88	85
LIV	6.7	8.2	65	68	7.7	8.7	78	82	7.5	7.7	80	74	4.9	7.4	84	81
LVIII	7.9	8.6	58	62	8.6	9.6	76	79	7.5	8.5	72	77	5.7	7.0	81	87
LXXVI	0.7	9.5	70	79	11.4	11.0	86	84	9.6	10.9	81	82	10.2	9.7	83	88
CII	7.6	6.8	76	41	8.7	8.7	87	73	10.8	8.3	83	63	8.4	5.0	96	43
CX	8.5	8.8	71	68	10.5	10.5	84	85	9.0	9.8	78	80	8.2	9.4	86	89
Total medians	8.5	8.7	68	68	10.3	10.1	82	84	8.7	9.4	77	79	9.3	8.5	86	86

TABLE VII—CONCLUDED.—EIGHTH GRADE.

CITY.	Addition.				Subtraction.				Multiplication.				Division.			
	Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.		Speed.		Accuracy.	
	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.	'15.	'16.
XX	8.6	7.8	71	85	10.5	10.3	76	85	10.2	8.7	75	83	8.9	7.8	85	84
XXVII	9.8	12.5	70	84	10.9	12.9	88	84	10.4	10.6	84	78	8.9	9.5	100	75
XXVIII	10.2	9.3	75	73	12.5	10.5	86	83	12.3	10.1	82	75	.....	8.4	.....	90
XLI	9.2	8.8	65	77	10.8	11.0	86	93	11.4	11.5	82	90	9.0	8.8	83	100
LIV	8.4	8.2	60	68	8.8	9.5	81	85	7.4	11.4	73	73	6.0	7.4	88	83
LVIII	7.9	8.8	68	70	9.7	10.3	84	83	8.8	9.6	82	82	9.2	8.1	94	88
LXXVI	11.8	10.7	52	72	14.6	12.4	91	89	12.0	11.9	88	86	11.5	12.1	99	58
CII	9.6	8.4	64	75	10.7	9.5	87	86	10.2	10.1	80	83	9.3	9.0	86	100
CX	9.7	9.8	74	71	11.8	11.7	88	87	10.7	11.1	82	82	10.2	10.4	94	90
Total medians	8.5	9.6	73	73	11.2	11.1	87	86	10.4	10.7	81	82	9.5	9.1	92	89

TABLE VIII.

Showing Quartile Scores of Cities Repeating Tests.

SPEED.

	Addition.			Subtraction.			Multiplication.			Division.		
	Q1.	Q3.	Q.	Q1.	Q3.	Q.	Q1.	Q3.	Q.	Q1.	Q3.	Q.
Grade 4:												
'14-'15,	4.4	7.1	1.4	4.4	7.7	1.7	3.3	6.2	1.5	2.5	5.4	1.5
'15-'16,	4.3	6.9	1.3	4.7	7.3	1.3	3.6	6.2	1.3	2.4	5.3	1.5
Grade 5:												
'14-'15,	5.6	8.2	1.3	6.1	9.3	1.6	5.5	8.7	1.6	3.2	5.3	1.1
'15-'16,	5.5	8.4	1.5	5.8	8.5	1.4	4.8	7.7	1.5	3.2	6.9	1.9
Grade 6:												
'14-'15,	6.3	9.5	1.6	7.3	10.9	1.8	6.5	9.7	1.6	4.7	7.1	1.2
'15-'16,	6.5	9.5	1.5	7.2	10.7	1.7	6.2	10.6	2.2	4.4	9.4	2.5
Grade 7:												
'14-'15,	7.9	10.3	1.2	8.4	12.0	1.8	7.2	10.5	1.7	6.9	11.7	2.4
'15-'16,	7.2	10.3	1.6	8.4	12.7	2.2	7.4	11.3	1.9	6.1	11.5	2.6
Grade 8:												
'14-'15,	7.8	11.4	1.8	9.3	14.6	2.7	8.5	12.8	2.2	7.3	13.3	3.0
'15-'16,	8.4	11.8	1.7	9.4	13.7	4.3	8.7	12.7	2.0	7.9	12.7	2.4

ACCURACY.

	Q1.	Q3.	Q.	Q1.	Q3.	Q.	Q1.	Q3.	Q.	Q1.	Q3.	Q.
Grade 4:												
'14-'15,	44	74	15	43	85	21	44	82	14	44	86	21
'15-'16,	44	72	14	43	85	21	44	78	17	45	69	12
Grade 5:												
'14-'15,	42	84	21	52	89	19	40	87	24	42	90	24
'15-'16,	42	82	20	54	96	21	40	86	13	42	88	23
Grade 6:												
'14-'15,	51	84	17	64	99	18	67	89	11	63	102	19
'15-'16,	40	83	27	64	98	17	58	88	15	59	102	22
Grade 7:												
'14-'15,	40	88	24	66	95	15	62	88	13	68	102	17
'15-'16,	52	84	16	69	99	15	64	95	16	69	103	17
Grade 8:												
'14-'15,	56	86	15	72	99	14	68	93	13	77	104	14
'15-'16,	56	86	15	74	99	13	68	93	13	74	103	15

CHAPTER III.

SPELLING.

This report on spelling is based upon the use of the Ayres Spelling Scale in the following cities:

Chanute, Kan.
Clinton, Ill.
Cleveland, Ohio.
Ellinwood, Kan.
El Reno, Okla.
Florence, Kan.
Ft. Scott, Kan.
Greenleaf, Kan.
Halstead, Kan.
Iola, Kan.
Liberty, Idaho.
Marshall, Mo.
Natoma, Kan.
Neodesha, Kan.
Norton, Kan.
Ottawa, Kan.
Parsons, Kan.
Peabody, Kan.
St. Marys, Kan.
Superior, Neb.
Valley Falls, Kan.
WaKeeney, Kan.
Wellington, Kan.
Winfield, Kan.

The Ayres Spelling Scale is so well known that it is thought unnecessary to reproduce it here. It consists of the 1000 words which are most frequently used in writing. After these words were determined, Ayres classified them, according to difficulty, into twenty-six groups. On the scale these groups are printed in columns, each column being designated by a letter of the alphabet. At the head of each column there is printed also the average per cent of correct spellings of each group of words for each school grade. These average per cents of correct spellings were determined by having these words spelled by 70,000 children in eighty-four different cities. These average per cents of correct spellings may be thought of simply as standards for the respective grades.

For the use of the Ayres Spelling Scale the following directions were prepared by the Bureau of Educational Measurements and Standards and furnished with the copies of the scales which were distributed:

FIG. 8.

BUREAU OF EDUCATIONAL MEASUREMENTS AND STANDARDS,
KANSAS STATE NORMAL SCHOOL, EMPORIA.

CLASS RECORD SHEET—SPELLING, USING THE AYRES SCALE.

City..... *School*..... *Grade*.....

Teacher..... *Date*.....

DISTRIBUTION OF PUPILS' SCORES.

	TRIAL I. Using List.....		TRIAL II. Using List.....		TRIAL III. Using List.....	
Grade in per cents.	Number of pupils.	Total number of misspelled words.	Number of pupils.	Total number of misspelled words.	Number of pupils.	Total number of misspelled words.
5.....						
10.....						
15.....						
20.....						
25.....						
30.....						
35.....						
40.....						
45.....						
50.....						
55.....						
60.....						
65.....						
70.....						
75.....						
80.....						
85.....						
90.....						
95.....						
100.....						
Totals...						
Class average.....						

DIRECTIONS FOR USING THE AYRES SPELLING SCALE.

Read the explanation of the scale which is given in the lower left-hand corner of the scale sheet. The numbers at the top of the scale sheet indicate about what per cent of correct spelling may be expected among children of the different grades. For example, if 20 words from column J were given as a spelling test, the class average for an entire second grade would probably be about 66 per cent; for a third grade, 84 per cent; for a fourth grade, 94 per cent; for a fifth grade, 98 per cent; and for a sixth grade, 100 per cent. That is to say, any list of words from column J would be a rather difficult test for the second grade, and a rather easy test for the fourth, and a very easy test for the higher grades. For the third grade it should be a fair test. Column M would furnish a fair test for the fourth grade; column O would furnish a fair test for the fifth grade. Hence in using the scale select the list of words from that column which may be expected to give about 84 per cent of correct spelling in the grade you wish to measure. (This makes it necessary to test each grade separately. If you have 6-A and 6-B grades, treat them both as one class. If on the other hand you have 6-A and 7-B, treat them as two separate classes.) Select a list of 20 words, leaving out any words which have been used in a recent spelling lesson. This is to be used as a first trial in measuring your class with the scale.

If after recording the scores it is seen that more than 10 per cent of the class have spelled all the words correctly it will be necessary to select a more difficult list. The list for a second trial should be selected from the column on the right of the column used in the first trial. (For the eighth grade one test, using column U, is sufficient.) Should the second trial also show that more than 10 per cent of the class have spelled all the words correctly, prepare a list from the next column to the right for a third trial.

Give the test at the time of the regular written spelling lesson. Do not tell the children that they are being tested nor that their papers are to be collected. Present the test in some such way as this: "Instead of our regular spelling lesson I wish to see how well you can spell these words."

Have the pupils prepare paper and pencil or pen and ink as they would for the regular spelling lesson, and proceed just as you would for such a lesson except as you observe these directions.

Have pupils write name and date at the top of the paper. Pronounce each word twice, being careful to speak slowly and distinctly.

Where words have more than one meaning for the same pronunciation the meaning desired should be indicated by giving a short illustrative sentence. *Give no other directions.*

Allow sufficient time for the pupils to write each word before pronouncing the next word. This does not mean to delay the test for the sake of a few who are exceptionally slow.

When you have allowed sufficient time for the writing of the last word of the tests, ask the pupils to exchange papers and mark them for misspelled words as you spell the words. Have each pupil write the grade in per cent and the number of misspelled words in the upper right-hand corner of the paper. As soon as this is done collect the papers without allowing the opportunity for correction of misspelled words.

For tabulating the results, the class record sheet as shown in Fig. 3 was devised. This class record sheet provides for three successive tests which were to be given as stated in the directions.

In using the Ayres Spelling Scale according to these directions, it is obvious that different words would be selected by different teachers. This makes impossible combining the results from the several cities in the way that would have been possible had the same test words been used

in all cities. The reports received indicated a variety of practices in reference to the column from which the words were taken for the respective grades. It appears that the directions with reference to the choice of the columns from which the words were taken were not followed in all cases. In view of this fact it has seemed wise to tabulate the results as shown in Table IX. This table shows simply the class averages. The table is to be read as follows: In City III words from column J were used in the test of the third grade. The class average corresponded with the fourth-grade standard given by Ayres on the scale. In testing the fourth grade, words from column J were also used and the class average corresponded to the fifth-grade standard. In testing the fifth grade, words from column M were used and the class average corresponded to the sixth-grade standard. In testing the seventh grade, words from column Q were used and the class average corresponded to the seventh-grade standard. In testing the eighth grade, words from column Q were used and the class average corresponded to the eighth-grade standard. In this city the second and third tests were given. In giving the second test to the third grade, words were chosen from column K. The class average corresponded with the third-grade standard. Words from column K were used also in testing the fourth grade and the class average of this corresponded with the sixth-grade standard.

In a number of the cities there were several classes of the same school grade. For example, in City XXXI there were five third-grade classes. In the first test the words were chosen from column J, and two of these classes had averages which corresponded with the third-grade standard; two other classes had averages which corresponded with the fourth-grade standard and one class had a class average which corresponded with the fifth-grade standard. The fact that the words were chosen from Column J does not mean that identically the same tests were given to all of these classes, but it does mean that the twenty words of the test were chosen from this column, and Ayres asserts that the words included within the column were approximately equal in difficulty.

At the bottom of the table there is summarized the number of classes whose class averages corresponded to the grade standards as indicated at the top of the columns. For example, in the case of the first trial, nineteen second-grade classes had class averages which were below the second grade standard; thirteen had class averages which were just second grade standard; and two had class averages which corresponded to the third grade standard.

It will be noted from this summary that almost half of the second-grade classes failed to make averages which corresponded to second-grade standards. In the case of the third and fourth grades, there are approximately as many classes whose averages were above the standard for the respective grades as below the standard. However, in the case of the fifth, sixth and seventh grades, there is a preponderance of the class averages which were below the standards for the respective grades. In the eighth grade nearly two-thirds of the class averages corresponded to eighth-grade standards.

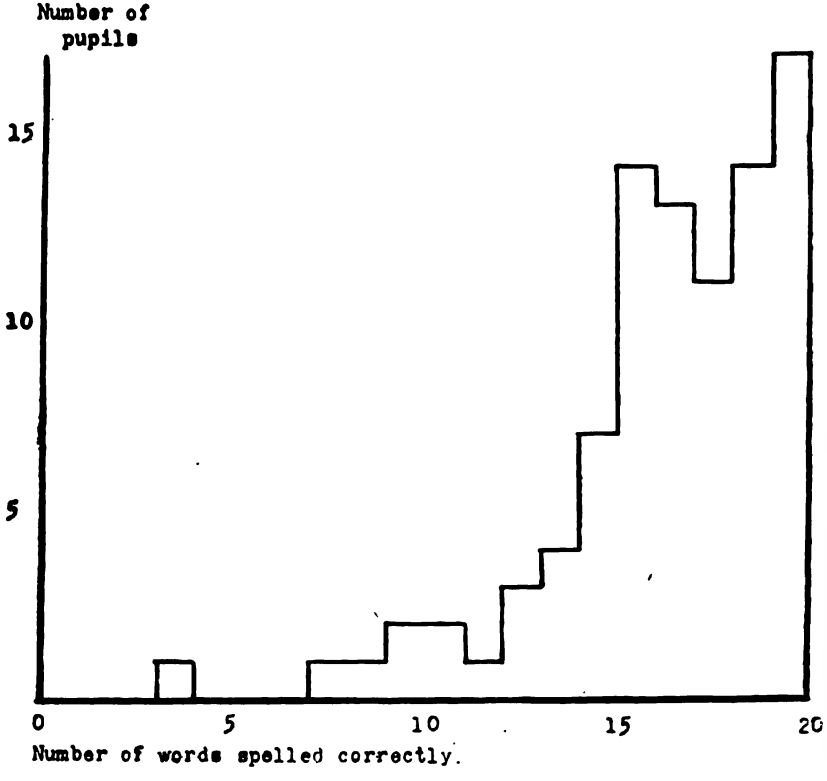
TABLE IX.—*Showing Class Averages in Spelling.*

CITY.	Second.					Third.						Fourth.							Fifth.							Sixth.							Seventh.							Eighth.				
	Column used.	2	2	3	4	Column used.	-2	2	3	4	5	Column used.	2	3	4	5	6	7	Column used.	3	4	5	6	7	8	Column used.	4	5	6	7	8	Column used.	4	5	6	7	8	Column used.	5	6	7	8
III						J				1		J				1			N				1													1		Q					1
Second trial						K			1			K					1		O			1													1		R					1
Third trial						L		1				L				1																			1		S	1				
VII																			O			1										S			1		U			1	
Second trial																			O			1										T	1								
Third trial																			P		1																					
XV	G		1			J			1			M				1			O			1				Q			1			S			1		U				1
Second trial	H		1			K				1		N				1			P			1				R						T		1			V				1
Third trial	I		1			L			1			O		1					Q				1			S		1				U		1			W				1
XXVI	G	1				J				1		M				1			O			1				Q			1			S			1						
Second trial	H	1				K			1			N		1					P				1			R		1				T		1							
Third trial	I	1				L			1			O		1					Q				1			S		1				U		1							
XXVII	G	2				J		2				L	1						O		1	3				Q	1	3				S		1			U				1
Second trial	H	1	1			K		1				M	1						P		3	1				R	1	1	1								V				1
Third trial	I	1										O			1																											
XXXI						J			2	2	1	M			1	3			O			3	1			Q			1	1	1	S			1		U				1
Second trial						J		1	1	3		M			2	2			O			2	2			R			1	2		S		1			U				1
Third trial						I			2	2	1	L			2	2													1	2		S		3			T				1
XXXIII	G	5			1	J		1	5			M	4	2					O			3	4			Q			5			T		3			U			1	
Second trial	H	2	4			K			1			M	2	3					O			2	4			Q			1	4		T		2			V			1	
Third trial	I		1			L		1				N		1					P			2				Q			1	4							W				1
XXXIX						H			1										J					1																	
Second trial						I		1											L			1																				
Third trial						J			1										O		1																					
XLI												N				1																										
Second trial												M					1																										
Third trial																																										
XLIX						H				1		L		1																							U				1
Second trial						J			1			L				1																						U				1
Third trial						K				1		M				1																						W				1

| | | |

FIG. 4.

Showing distribution of 91 pupils according to the number of words spelled correctly. Class average, 84 per cent.



CHAPTER IV.

SILENT READING.

This report on silent reading is based upon the use of the Kansas Silent Reading Tests during the years 1915-'16 and 1916-'17. Within this time more than 700,000 copies of these tests have been distributed by the Bureau of Educational Measurements and Standards. Out of the total number of tests distributed, reports have been received from more than 100,000 pupils in 160 cities. These tests are so well known that they will be described only briefly here. An account of their derivation may be found in the *Journal of Educational Psychology* for February, 1916. Sample copies of these tests may be obtained from the Bureau of Educational Measurements and Standards, Emporia, Kan.

Three tests make up the series. Test I is for grades 3, 4, 5; Test II, for grades 6, 7, 8; and Test III, for grades 9, 10, 11, 12. Each test consists of sixteen exercises. The exercise requires the pupil to make a definite response. The tests may be said to be objective in the sense that there is little opportunity for differences of opinion in marking the test papers. The nature of the exercises is illustrated by the following exercises selected from Test II:

Value 1.0	No. 1. The air near the ceiling of a room is warm, while that on the floor is cold. Two boys are in the room, James on the floor and Harry on a box eight feet high. Which boy has the warmer place?
Value 1.6	No. 3. We can see through glass, so we call it transparent. We can not see through iron, so we call it opaque. Is black ink opaque, or is it transparent?
Value 2.4	No. 7. A boy goes to school in the morning, goes home at noon for lunch, returns to school at 1 o'clock and returns home at 4 o'clock. How many times does he travel between home and school that day?
Value 4.0	No. 11. "The curfew tolls the knell of parting day, The lowing herds wind slowly o'er the lea, The ploughman homeward plods his weary way, And leaves the world to darkness and to me."—(*Gray.*) Study the above quotation carefully. The author lets us know his feeling about the coming of night. If you think his feeling is one of fear and dread, underscore curfew. If his feeling is one of peace and gladness, underscore ploughman.

It will be noticed that each exercise has been evaluated in terms of a common unit. A pupil's score is the sum of the values of the exercises which the pupil does correctly in five minutes.

In Table X there are given the median scores for the first-, second-, and third-class cities of Kansas, for Iowa, and for the other states by groups. In addition to the median scores there are given the number of pupils taking the tests in each group of states. The medians of this table are based upon over 100,000 scores. The median scores for the cities on which this summary is based are given in Table XIII. In most of these cities all the pupils enrolled in the several grades were tested, or in the case of some of the larger cities the tests were given to a sufficient number of pupils so that we may be certain that a representative group were tested. In the case of a very few cities the tests were secured by individual teachers and given only to the pupils in one or two buildings.

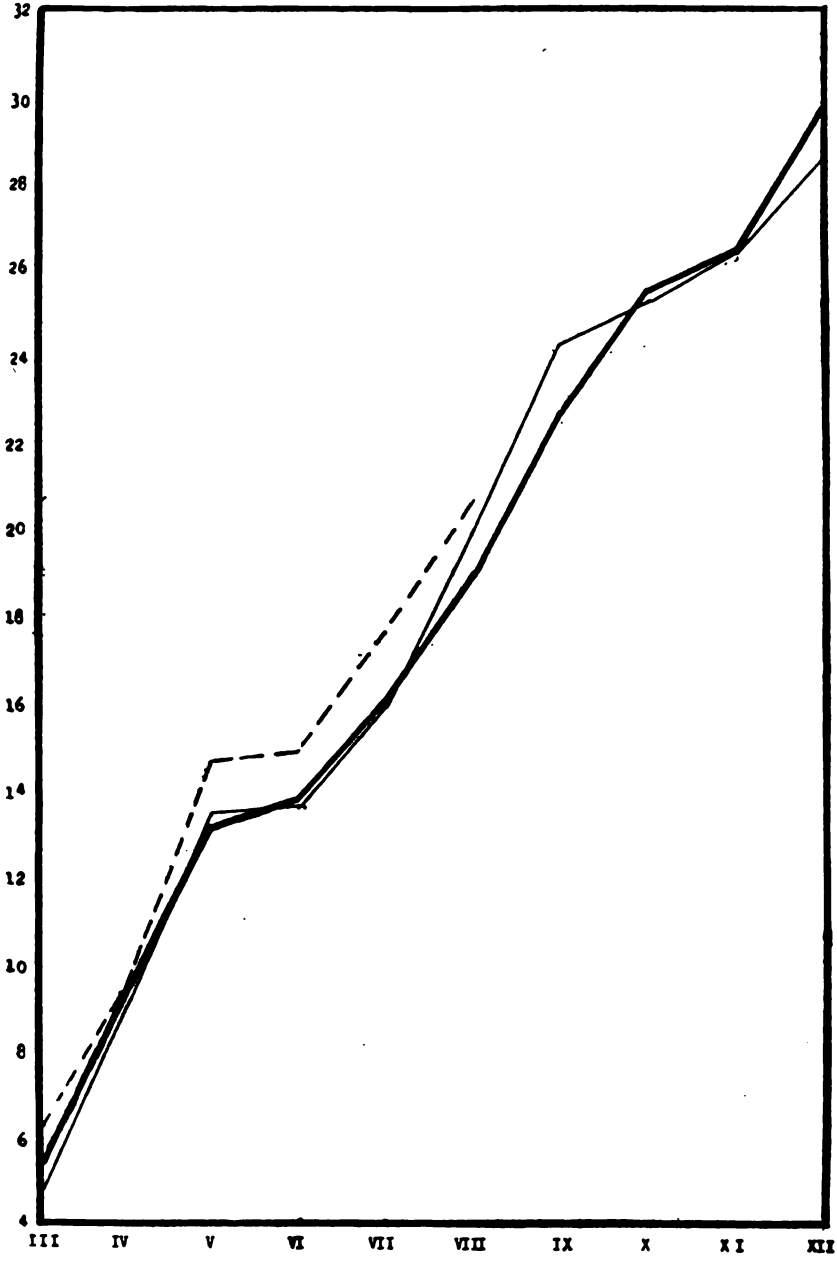
In interpreting these tables it is necessary to keep in mind that the scores of pupils are influenced by several factors. (See page 9.) A few of the very high medians are doubtless due to the fact that the pupils tested were not representative of the school. In some cases it appears probable that the high median is due to the fact that they are based upon scores from only a small number of pupils which are clearly not representative of their group. For example, this is doubtless true in Table X in the case of the tenth-grade median for Kansas second-class cities and for the twelfth-grade median of the southern states. The total median and the medians for Kansas and Iowa are represented graphically in Fig. 5. The total medians are represented by the heavy solid line, the Kansas medians by the light solid line, and the Iowa medians by the broken line. In studying this figure it should be remembered that Test I was used for grades 3, 4, 5, and Test II for grades 6, 7, 8. This change in tests probably accounts for the apparent lack of increase in ability to read silently from grade 5 to grade 6. A similar change of tests occurs between the eighth and ninth grade, but apparently this change did not affect the scores in the same way as the change of tests at the sixth grade.

The median scores for Kansas agree very closely with the total median scores. It is interesting to note that the median scores for Iowa are conspicuously above the total medians and the Kansas medians. By reference to Figs. 1 and 2 it will be found that a similar condition exists in the case of arithmetic. Apparently the public schools of Iowa are able to do superior work in the case of these subjects.

The reports from the several states have been grouped into five sections and the median scores for each group given in Table X. The median scores for the several groups of states agree rather closely, on the whole, where the number of pupils tested is one hundred or more. There are, however, some slight variations which are rather interesting. The median scores for the South Atlantic states are, on the whole, the lowest. It was hoped that we would secure some additional reports, since the medians given here are based almost entirely upon reports from one large southern city. This fact may be sufficient to account for the low medians.

FIG. 5.

Showing the median scores for Kansas Silent Redding Tests. Medians based on over 100,000 scores. Kansas————————, Iowa- - - - - - - -; total————————.



The medians for the Western states are among the highest. Just why these medians should be so much higher than the medians from the other sections of the country is not clear. It may be that the medians are not based upon reports from representative cities. Another possible reason is that in other sections of the country children of foreign parentage are more of a factor. In cities where there are a considerable number of children of foreign parentage it has been found that in general they make lower scores.

Ability to read silently incurs two factors: First, rate of silent reading; and second, understanding or comprehension of the material read. Sometimes this second factor is called quality of reading. In the case of the Kansas Silent Reading Tests these two factors are combined in a single score. The values assigned to the exercises which make up these tests were made proportional to the average length of time required to do the several exercises correctly. Since the two factors are combined in this way, we have no expression of the relative weight of each in the value of the exercises.

In Figs. 6 and 7 are shown the curves of progress for rate of silent reading and for quality of silent reading as determined by means of the Gray Silent Reading Tests.[1] The curve of progress for the rate of silent reading, Fig. 6, rises rapidly for the earlier grades and less rapidly in the upper grades, with the partial exception of the eighth grade. This means that the pupil in learning to read increases his rate of silent reading rapidly in grades 2, 3, and 4. In the following grades his increase is very slight. When we study the curve of progress for quality of silent reading in Fig. 7 we find that the pupil continues to increase the quality of his silent reading at about the same rate throughout the several grades represented. Apparently the pupils' improvement in silent reading in the upper grades is in quality rather than rate. This increase in quality in the case of the Gray Silent Reading Tests means that the pupil is able to comprehend more difficult passages as well as to comprehend them more fully.

If we compare these two curves of progress with the curve of progress for the Kansas Silent Reading Tests shown in Fig. 5, we find the curve of progress for the Kansas Silent Reading Tests corresponds closely in shape to the curve of progress for quality of silent reading. This fact suggests that the scores made on the Kansas Silent Reading Tests are measures of the quality of silent reading rather than the rate of silent reading. No final conclusion should be drawn from the data presented in these three figures because the tests were not applied to the same groups of pupils, but since both of the tests have been used rather widely, particularly the Kansas Silent Reading Tests, it probably is safe to think of the Kansas Silent Reading Tests as placing more emphasis upon comprehension or quality of silent reading than upon rate of silent reading.

It has frequently been asked, What is the effect upon a pupil's score of his acquaintance with the test? No definite study has been made to

1. Gray, William S., Studies of Elementary School Reading from Standardized Tests, pp. 53-54. Supplementary Educational Monographs, University of Chicago.

FIG. 6.

Progress of pupils in rate of silent reading as measured by the Gray Silent Reading Tests.

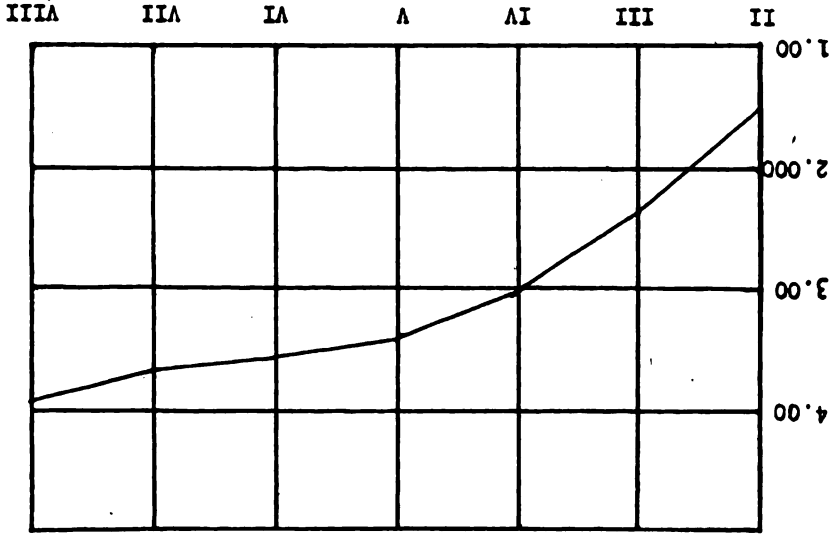
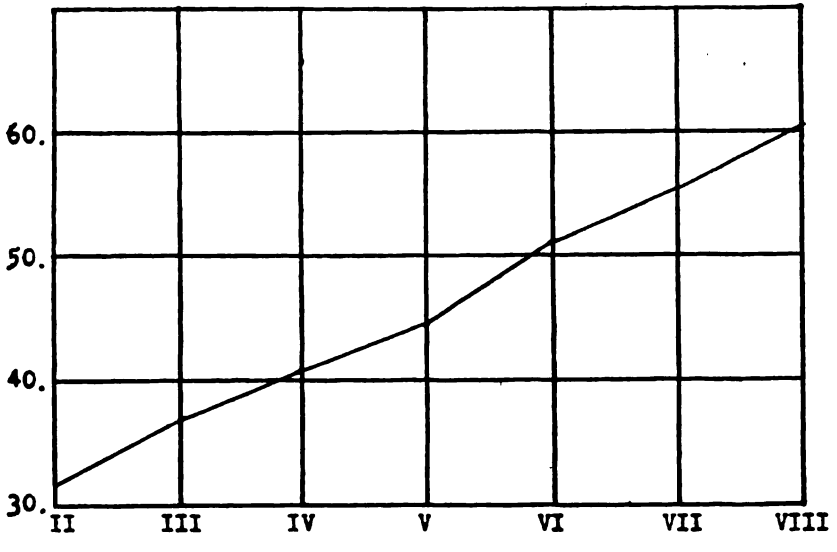


FIG. 7.

Progress of pupils in quality of silent reading as measured by the Gray Silent Reading Tests.



determine the answer to this question. It has been a rather important question because only one form of the Kansas Silent Reading Tests was available, and if a superintendent wished to know what improvement had been made in silent reading he was forced to repeat the same test.

It is probable that several factors will affect the second set of scores. If the tests have been made the subject of a study by the pupils, without doubt the scores will be much higher. If the pupils have been drilled upon the type of reading which these tests call for, doubtless the second set of scores will be much higher than the first set.

In Table XI there are given two sets of scores for several cities in which the tests were given the second time and both sets of scores reported to the Bureau of Educational Measurements and Standards. A study of this table will show that in certain cases the second set of scores are conspicuously higher than the first set. In certain other cases they are lower. The facts of this table suggest that the pupil's acquaintance with the tests, through merely having taken it, does not greatly influence a second score. Otherwise it would be difficult to understand how a second set of scores might be lower than the first set.

In Table XII there are given the median scores for several adult groups to whom the tests were given. Generally these groups were teachers assembled in institute or students in education classes. These medians have no special significance aside from indicating the scores which may be expected of adults.

Numerous criticisms have been made upon the Kansas Silent Reading Tests. A number of these are probably valid and significant. Only a few of the criticisms reported to the Bureau of Educational Measurements and Standards have had to do with insignificant details. The most frequent criticism has been concerning the character of the exercises. It has been pointed out that the exercises partake of the nature of puzzles, a very large number of them being arithmetical in nature. For this reason they are not typical reading material. This criticism is obvious to any one who examines the tests, and was very obvious to the author of the tests before they were published for distribution. The author attempted to eliminate this defect of the tests, but it was found impossible at that time. Granted that this criticism is valid, it remains to determine just how much it limits the significance of the scores obtained.

The above characteristic of the tests was due largely to the fact that an effort was made to have the tests objective; that is, to have them of such a nature that a minimum of opinion would be exercised in marking the papers. This is a feature which is very important and which is not true of most of the reading tests which have been devised. The question might well be raised whether or not it was worth while to sacrifice considerable to obtain this feature.

It has also been said that the ability measured by these tests was the ability to reason rather than to read; that in ordinary reading the mental processes involved were not those of reasoning, hence the scores obtained by means of these tests had no particular significance with reference to reading. The significance of this criticism of course depends

upon what reading is. Certainly the exercises of these tests do have to do with the ability which occurs in some reading. It is probably true that a more satisfactory test could be devised by securing exercises which are more nearly like the ordinary reading material which the child deals with in the elementary school.

A number who have used the tests have taken occasion to say that they found the tests very easy to administer and requiring only a small amount of time. In fact, no one has reported any difficulty in using the tests, or even asked questions. This fact is significant, because if teachers are to use tests they can not be expected to use tests which they do not understand or which require an unusual expenditure of time.

TABLE X.—*Kansas Silent Reading Test, median scores based on over 100,000 scores.*

	III.		IV.		V.		VI.		VII.	
	M.	Pupils.	M.	Pupils.	M.	Pupils.	M.	Pupils.	M.	Pupils.
Kansas:										
First-class cities	4.5	1,873	8.8	2,017	13.1	1,519	13.8	1,590	16.1	1,546
Second-class cities	5.9	966	9.7	1,067	14.3	994	14.3	1,024	17.3	613
Third-class cities	4.6	373	8.2	524	11.8	471	12.5	518	14.0	352
Kansas total	4.9	3,212	9.0	3,609	13.4	3,284	13.7	3,132	16.1	2,145
Iowa	6.2	2,371	9.5	2,940	14.6	2,695	14.8	2,597	17.7	2,143
South Atlantic states	6.0	398	9.2	350	13.9	332	11.6	326	14.5	179
North Atlantic states	5.3	5,780	9.6	3,658	12.9	4,020	13.6	3,168	16.7	3,183
South Central states	4.7	686	8.4	723	12.3	702	11.8	602	15.4	498
North Central states	5.1	6,358	9.3	6,453	13.1	6,540	13.6	5,762	16.2	5,374
Western states	6.1	2,282	10.6	2,509	14.4	2,643	15.0	2,673	18.0	2,508
Grand total	5.3	21,087	9.5	20,242	13.2	20,216	13.9	18,260	16.2	16,396

TABLE X.—CONCLUDED.

	VIII.		IX.		X.		XI.		XII.	
	M.	Pupils.	M.	Pupils.	M.	Pupils.	M.	Pupils.	M.	Pupils.
Kansas:										
First-class cities	19.7	1,334	25.3	317	27.1	199	27.8	201	29.7	115
Second-class cities	20.6	596	33.7	12	33.6	32	.....	.....	.....	.....
Third-class cities	20.6	560	20.6	346	23.7	289	26.0	262	27.6	250
Kansas total	20.1	2,490	24.3	735	25.2	520	26.5	463	28.4	365
Iowa	20.6	1,819	.....	.....	.....	.....	.....	.....	.....	.....
South Atlantic states	15.8	179	21.8	110	20.7	96	25.0	78	39.3	8
North Atlantic states	17.8	1,948	24.8	345	28.9	122	22.8	53	27.0	47
South Central states	19.2	350	22.4	121	24.5	133	25.0	68	29.2	74
North Central states	18.2	5,060	21.5	1,356	25.7	1,045	26.5	736	31.8	612
Western states	20.6	2,075	23.5	232	26.0	234	26.4	186	31.4	115
Grand total	19.2	13,921	22.9	2,899	25.6	2,150	26.5	1,584	29.7	1,221

TABLE XI.

Cities giving the tests twice.

CITY.	Date.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
LXXV	11-15	3.1	7.3	12.4	12.1	13.5	18.2	22.7	25.1	20.0	30 0
LXXV	4-16	7.3	11.9	16.0	18.8	20.9	27.0	30.0	28.3	34.8	29 5
XXVII	4-16	3.5	7.4	12.9	11.7	16.3	18.4	.....	.....	.....	.....
XXVII	3-17	4.5	13.8	14.3	13.2	19.5	21.6	.....	.....	.....	.....
CLXVIII	10-16	.....	5.0	9.4	8.6	14.4	13.0	.....	.....	.....	.....
CLXVIII	4-17	.....	9.7	17.6	11.1	20.1	18.0	.....	.....	.....	.....
VIII	5-16	4.4	8.0	13.0	14.0	16.8	26.8	.....	.....	.....	.....
VIII	2-17	5.9	7.5	13.7	13.7	15.0	19.1	.....	.....	.....	.....
XLV	1-16-17	6.0	9.5	14.6	16.0	18.8	22.1	.....	.....	.....	.....
XLV	1-23-17	.....	.....	.....	15.0	17.8	19.5	.....	.....	.....	.....
LXXIII	5-16	2.9	7.8	12.5	11.7	14.6	13.0	.....	.....	.....	.....
LXXIII	1-17	2.5	6.7	10.9	10.7	12.8	14.7	.....	.....	.....	.....
CVIII	9-16	0.0	3.5	7.0	8.0	16.5	21.0	19.2	20.3	25.0	21.0
CVIII	1-17	.....	.....	.....	.....	.....	.....	18.0	25.0	33.3	40 0
CXXXI	9-16	.8	5.0	6.4	13.0	15.0	16.7	.....	.....	.....	.....
CXXXI	1-17	6 6	11.0	12.3	18.0	18.0	21.6	.....	.....	.....	.....

TABLE XII.

Showing median scores for adults.

TEST.	Medians.	Number tested.
II	34.6	54
I	18.5	62
III	35.0	64
III	35.8	330
I	23.0	65
II	32.0	65
III	40.4	65
———	36 8	36
———	34 8	37

TABLE XIII.

Showing median scores of cities.

NUMBER.	Date.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
SOUTH ATLANTIC STATES.											
XL	3–16	13.0	16.6	19.2	17.1	23.7	.....	21 5	31.6	38.3	39.3
XLII	1–17	.....	12.9	12.8	14.4	19.1	.....	.....	.....	.....	.....
LXXXIX	5–16	5.9	9.5	14.7	12.2	11.9	15.2	21.9	20.0	25.2	.....
CLIX	1–17	.....	.....	11.3	.....	.....	.....	.....	.....	.....	.....
CLXVIII	10–16	.....	5.0	9.4	8.6	14.4	13.0	.....	.....	.....	.....
CLXVIII	4–17	.....	9.7	17.6	11.1	20.0	18.0	.....	.....	.....	.....
SOUTH CENTRAL STATES.											
XXI	11–16	5.6	10.6	14.6	15.5	18.0	.....	.....	.....	.....	.....
LVII	4–16	6.3	8.8	12.8	14.6	11.2	18.6	.....	.....	.....	.....
LXV	3–16	4.8	8.0	11.9	11.7	14.9	19.1	.....	.....	.....	.....
CXXVI	3–17	.....	.....	.....	16.2	.....	.....	.....	.....	.....	.....
CXLV	11–16	.....	.....	.....	.....	.....	.....	18.7	26.4	26.5	30.0
CLI	1–17	.....	8.6	.....	.....	.....	.....	.....	.....	.....	.....
CLV	12–16	4.2	10.5	12.7	13.2	21.7	21.7	22.2	24.0	30.0	30.0
CLXIX	6–16	.....	.....	.....	.....	.....	.....	25.4	25.5	21.3	29.9
NORTH ATLANTIC STATES.											
VI	6–16	5.7	9.2	14.8	16.1	17.9	23.7	23.1	29.6	21.4	25.6
X	5–16	4.4	5.6	15.1	11.9	16.8	18.3	23.5	29.0	.....	.....
XXIV	12–16	7.7	9.5	15.1	16.2	21.0	24.4	.....	.....	.....	.....
XXXV	6–16	3.2	4.6	10.4	14.0	14.6	17.9	.....	.....	.....	.....
LXIII	3–16	1.4	8.1	12.6	15.9	15.1	19.5	24.1	25.1	27.6	25.1
LXVIII	4–16	1.2	7.6	9.0	11.0	16.8	17.5	.....	.....	.....	.....
LXXII	4–16	7.5	11.1	16.2	15.0	18.5	20.6	27.9	.....	.....	.....
LXXXV	5–16	6.7	13.3	13.9	10.6	.....	.....	.....	.....	.....	.....
XCVII	4–16	6.0	9.9	12.6	12.1	18.4	19.5	.....	.....	.....	.....
CXXXVII	1–17	3.8	5.3	14.3	14.5	15.0	16.8	24.0	31.5	27.0	30.0
CL	3–17	5.9	9.9	13.7	13.6	16.5	17.4	.....	.....	.....	.....
CLXVII	4–17	.....	.....	17.5	.....	.....	17.3	.....	.....	.....	.....
CLXXX	4–17	8.7	13.8	16.9	17.2	20.3	27.4	.....	.....	.....	.....
WESTERN STATES.											
I	11–16	2.6	7.2	12.1	16.5	14.0	17.3	.....	.....	.....	.....
V	2–17	4.8	12.5	12.8	17.3	16.5	21.0	24.0	25.0	30.0	30.0
VIII	5–16	4.4	8.0	13.0	14.0	16.8	26.3	.....	.....	.....	.....
VIII	2–17	5.9	7.5	13.7	13.7	15.0	19.1	.....	.....	.....	.....
XV	11–16	.....	.....	11.0	8.0	.....	11.2	.....	.....	.....	.....
XLV	1-16–17	6.0	9.5	14.6	16.0	18.8	22.1	.....	.....	.....	.....
XLV	1-23–17	.....	.....	.....	15.0	17.8	19.5	.....	.....	.....	.....

WESTERN STATES—CONCLUDED.

NUMBER.	Date.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
LVI	3-16	4.2	6.8	11.5	10.5	12.9	16.5				
LXXIX	5-16	6.9	11.1	14.6	14.5	17.5	22.0	22.6	22.9	22 0	30 3
LXXXVIII	5-16				18.4	18.0	17.7				
CV	6-16	6.9	11.3	14.9	15.4	17.9	17.9	26.1	26.5	34.7	38.7
CXL	3-17							19.5	29.2	27.1	36.1
CXLIV	1-17	4.0	7.3	11.9	8.8						
CXLVI	4-16	5.7	9.3	13.3	14.0	17.3					
CXLVIII	11-16	3.6	8.7	13.0	15.4	19.3	17.5				
CXLIX	2-17	2.5	4.3	8.3	9.0	11.0		22.5			
CLXVI	4-17								26.6	29.9	30.2

NORTH CENTRAL STATES.

III	11-16										34.6
IV	11-15		6.4	9.9	10.4	18.4	13.9				
IX	12-15	5.4	5.7	11.7	15.2	13.5	18.7				
XII	1-16	7.8	13.6	14.0	16.1	18.6	21.0				
XIII	11-16	4.0	8.2	16.8	19.2	22.5	25.0	30.0	32.5	33.7	32.0
XIV	11-16			10.9	15.1	15.9	19.2				
XVII	1-16	3.8	10.3	13.4	18.2	19.1	22.7				
XVIII	1-16	2.5	4 2	9.7	9.4	14.0	18.1				
XIX	5-16		7.5	12.2	12.2	14.3	16.1				
XXIII	1-16	6.7	10.0	14.5	14.3	17.1	20.0	20.7	23.0	25.6	30.
XXV	11-16							26.4	32.0	32.5	
XXXIII	11-16					16.6	19.5	22.7	24.8	21.7	
XXXVI	2-16	1.7	7.4	12.0							
XXXVII	1-17	5.7	12.9	20.2	13.7	20.4	24.6	28.0	32.2	41.7	40.0
XLI	1-17	6.7	10.8	10.5	15.0	15.8	18.5	21.0	24.0	26 0	24.0
XLII	5-16	7.0	12.5	12.8	18.0	17.5	18.0	18.3	26.3	23.0	29 0
XLIII	2-16							15.0	19.5		
XLVII	3-16							20.7	24.4	25.8	25.5
L	2-17	4.6	9.8	13.2	15.0	18.3	17.7				
LII	1-17	4.9	10.7	13.7	12.9	16.2	19.6				
LV	4-16	5.5	9.7	12.4	15.7	19.7	21.4				
LIX	3-16	4.1	8 8	12.8	11.9	16.1	14.2	19.0	22.1	26.0	30.7
LXI	4-16	1.9	7.2	11.5	13.2	14.3	18.3				
LXVI	3-16							20.3	26.0	19 5	28.5
LXIX	4-16	5.7	11.6	14.6	13.0	16.5	18.9	22.5	25.5	28.8	29 4
LXX	4-16	3.4	8 5	13 6	13.2	15.4	18.8	22.5	26.2	26 0	31.4
LXXIII	5-16	2.9	7.8	12.5	11.7	14.6	13.0				
LXXIII	1-17	2.5	6.7	10.9	10.7	12.8	14.7				
LXXIV	4-16	6.7	10.3	13.0	13.8	16.9	19.6				

NORTH CENTRAL STATES—CONCLUDED.

NUMBER.	Date.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
LXXX	5-16	6.7	12.2	15.4	.....	15.2	26.0	.....	.....	.....	.....
LXXXII	5-16	.....	.....	.....	.....	16.6	.....	.....	33.9	.....	.....
XCIII	5-16	6.7	10.7	17.4	14.3	.....	20.0	21.0	.....	.....	.....
XCV	5-16	6.7	12.3	16.8	15.9	21.7	20.3	.....	.....	.....	.....
XCVI	5-16	4.5	9.5	12.7	12.7	15.2	15.0	.....	.....	.....	.....
CVIII	9-16	0.0	3.5	7.0	8.0	16.5	21.0	19.2	20.3	25.0	21.0
CVIII	1-17	.....	.....	.....	.....	.....	.....	18.0	25.0	33.3	40.0
CXI	9-16	6.2	9.9	13.7	13.4	17.2	19.9	.....	.....	.....	.....
CXIV	4-16	7.7	12.0	16.5	17.0	17.0	12.6	.....	.....	.....	.....
CXVI	5-16	7.6	10.3	9.0	12.7	17.5	18.0	19.9	27.0	26.0	27.0
CXXIV	11-16	7.2	12.1	15.9	18.8	18.8	19.9	20.5	24.4	26.3	33.0
CXXVI	2-17	.....	7.1	.....	.....	14.4	.....	.....	.....	.....	.....
CXXVII	2-17	0.0	8.3	9.7	13.0	.....	.....	.....	.....	.....	.....
CXXVIII	1-17	5.7	6.9	10.6	11.7	16.9	20.4	.....	.....	.....	.....
CXXIX	11-16	.....	.....	.....	.....	.....	27.0	.....	.....	.....	.....
CXXX	12-15	4.0	13.0	14.0	13.0	18.0	16.5	20.3	32.0	25.5	21.0
CXXXI	9-16	.8	5.0	6.4	13.0	15.0	16.7	.....	.....	.....	.....
CXXXI	1-17	6.6	11.0	12.3	18.0	18.0	21.6	.....	.....	.....	.....
CXXXII	1-17	.....	7.2	12.1	14.2	15.9	18.0	.....	.....	.....	.....
CXXXIII	11-16	.....	12.0	.....	.....	.....	.....	.....	.....	.....	.....
CXXXIV	9-16	4.0	5.0	11.7	11.5	11.0	14.0	25.5	26.0	24.0	25.5
CXXXVIII	12-16	7.0	9.0	14.0	12.3	12.6	9.6	.....	.....	.....	.....
CXXXIX	2-17	5.6	7.5	11.7	11.5	14.1	20.6	.....	.....	.....	.....
CXLI	3-17	.....	.....	.....	.....	.....	21.0	.....	.....	.....	.....
CXLII	9-16	0.0	5.0	12.0	5.7	12.0	14.5	.....	.....	.....	.....
CXLII	3-17	4.9	7.2	12.6	11.6	14.4	17.0	.....	.....	.....	.....
CLIV	11-16	4.6	11.6	15.2	12.3	19.2	18.3	.....	.....	.....	.....
CLVI	11-16	4.4	8.3	9.8	12.1	16.0	16.4	.....	.....	.....	.....
CLVII	3-16	.....	7.7	9.0	11.0	12.0	18.0	18.0	12.0	27.0	24.0
CLX	5-16	6.0	9.8	13.5	16.0	17.7	18.8	24.5	27.0	28.2	27.7
CLXI	12-16	1.9	5.3	11.9	12.7	.....	.....	.....	.....	.....	.....
CLXII	4-16	.....	.....	10.6	13.8	8.3	19.5	19.3	29.9	26.6	23.1
CLXIII	1-17	2.7	6.6	11.4	10.4	12.8	15.0	.....	.....	.....	.....
CLXIV	4-17	10.5	16.8	16.3	13.8	20.0	22.4	.....	.....	.....	.....
CLXVI	3-17	5.9	.....	.....	.....	.....	.....	.....	.....	.....	.....
CLXXXI	6-16	6.6	15.7	13.0	12.7	18.8	19.5	.....	.....	.....	.....
CLXXXIII	11-16	2.5	6.0	11.0	11.4	13.0	18.0	.....	.....	.....	.....
CLXXXIV	1916-17	6.2	9.5	14.6	14.8	17.7	20.6	.....	.....	.....	.....
CLXXXV	1-16	.....	.....	.....	.....	.....	.....	18.4	25.3	22.7	28.0
CLXXXVI	4-16	.....	.....	.....	.....	.....	.....	27.8	.....	.....	.....

Kansas Medians.

FIRST-CLASS CITIES.

NUMBER.	Date.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
XVI	2 16	5.2	9.6	14.8	15.5	15.6	19.8	.....	.....	.....	.....
XX	1-16	3.0	10 9	11.0	10.2	13.0	16.5	.....	.....	.....	.....
LXXII	1-16	5.6	10.1	13.5	15.8	19.5	23.3	.....	.....	.....	.....
LXXV	11-15	3 1	7 3	12.4	12.1	13.5	18.2	22.7	25.1	20.0	30 0
LXXV	4-16	7.3	11 9	16.0	18.8	20.9	27.0	30.0	28.3	34.8	29.5
CLXX	10-16	3 9	7 1	11.6	12 7	16 2	19 5	.....	.....	.....	.....

SECOND-CLASS CITIES.

XXII	4-17	5.6	9.0	14.5	11.4	15.0	26.4	.....	.....	.....	.....
XXVI	3-16	5.4	10.0	13.0	11.7	18.0	21.0	.....	.....	.....	.....
XXVII	4-16	3.5	7.4	12.9	11.7	16.3	18 4	.....	.....	.....	.....
XXVII	3-17	4.5	13.8	14.3	13.2	19 5	21.6	.....	.....	.....	.....
XXX	5-16	5.5	11 5	9.8	14.7	17 4	18.6	.....	.....	.....	.....
XXXI	5-16	7.2	11 1	14 7	13.8	17.5	22.4	.....	.....	.....	.....
LI	2-16	5.3	10.0	14.7	13.5	24.3	23.5	.....	.....	.....	.....
LIV	3-16	7.4	9.8	13.5	14.1	18.9	22.5	33.8	33.6	.....	.....
LVIII	2-16	5.2	10.3	15.5	14.9	14.5	14.0	.....	.....	.....	.....
LXXXI	4-16	9 3	13.8	16.6	15.8	19.8	17.0	.....	.....	.....	.....
CXX	1-17	5.7	10 2	15.6	17.3	.....	.....	.....	.....	.....	.....
CLXXVIII	2-17	6.6	10 2	16 1	14.5	21.0	17.0	.....	.....	.....	.....

THIRD-CLASS CITIES.

II	12-16	.....	3.5	12.1	14.2	13.8	15.6	30.0	42.5	42.8	.....
VII	9-16	1 2	2.7	7.0	11.8	11.6	12.3	19.7	20.5	27.6	26.4
XI	10 15	2.0	1.0	5.2	13.7	13.0	23.5	23.5	21.8	26.6	30 0
XXVIII	2-16	.....	.....	8.8	12.7	.....	.....	21.6	32 5	30.0	40.0
XXIX	2-16	9.5	7.0	11.6	8.6	12.8	19.2	.....	.....	.....	.....
XXXII	2-16	.....	.....	.....	8.1	18.3	17.6	27.0	28.2	31.4	18 8
XXXIV	1916	5.3	14.5	11.6	11.7	15.0	18.8	.....	.....	.....	.....
XXXVIII	1916	.....	.....	.....	10.9	13.4	14.8	18.0	16.8	16.4	25.1
XXXIX	1916	.....	.....	.....	5.0	16.1	18.0	24.0	22.5	18.8	26 0
XLVIII	3-17	3.0	10 5	13 0	16.0	18.0	20.1	19.0	.....	24 8	35.0
XLIX	1-16	.....	.....	12.0	11.0	13.0	15.2	15.6	24.2	25.1	28.1
LIII	3-16	.....	.....	.....	.....	.....	.....	26.5	25.4	27.0	43 0
LX	3-16	.....	6 0	.....	9.0	.....	15.0	.....	.....	.....	.....
LXII	3-16	5.6	7.0	14.8	12.8	15.7	17.1	21.0	18.6	26.8	22.9
LXIV	2-16	.....	.....	.....	.....	.....	.....	21.0	18.0	30.4	24.7
LXVII	2-16	5.5	6 8	16.3	12.8	20.5	24.9	20.7	25.1	25.1	30.2
XCII	5-16	4.0	7 6	14.3	19.5	16.3	17.5	19.5	25.8	25.1	30 0

THIRD-CLASS CITIES—CONCLUDED.

NUMBER.	Date.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
CIII.....	5-16	4.3	7.4	11.3	13.0	13.0	15.6	.....	.....	.....	.....
CIV.....	6-16	7.4	8.6	11.7	15.7	.....	.....	.....	.....	.....	.....
CXII.....	2-16	4.5	7.0	15.0	13.0	13.0	21.0	21.0	25.5	24.0	30.5
CXIX.....	12-15	.....	6.8	9.5	15.9	11.8	17.5	18.0	19.4	27.8	25.4
CXXIII....	3-17	.....	.....	.....	7.7	11.0	12.0	.....	.....	.....	.....
CLXXII....	2-16	.....	.....	11.0	.....	18.0	22.5	.....	.....	50.0	30.0
CLXXIII...	1-17	.....	.....	.....	.....	.....	.....	28.3	25.0	22.5	33.3
CLXXIV...	.....	.....	.....	.....	12.6	18.0	.....	.....	.....	.....	.....
CLXXV....	3-17	8.5	9.0	13.3	13.0	15.0	16.8	21.0	24.0	23.3	27.0
CLXXVI...	2-17	.....	.....	13.0	12.0	.....	.....	.....	.....	.....	.....
CLXXVII...	4-17	.....	9.9	11.7	.....	.....	.....	.....	.....	.....	.....
CLXXIX...	4-17	5.4	6.8	13.2	12.8	15.4	16.7	21.6	19.2	26.6	25.1
CLXXXII..	1917	4.5	9.7	14.5	11.2	15.0	21.0	.....	.....	.....	.....

CHAPTER V.

VISUAL VOCABULARY.

The ability to read silently is a composite ability. Among the several abilities included in it is the ability to associate with the printed word its meaning. For measuring the ability to associate meaning with words Prof. E. L. Thorndike has devised a Visual Vocabulary Test, which is reproduced below. This test is preceded by a preliminary test which makes the pupil acquainted with what he is asked to do.

THORNDIKE READING SCALE A.

Visual Vocabulary.

Devised by E. L. THORNDIKE.

Write your name here.....

Write your age here: .....years.....months.

Look at each word and write the letter F under every word that means a *flower.*

Then look at each word again and write the letter A under every word that means an *animal.*

Then look at each word again and write the letter N under every word that means a boy's *name.*

Then look at each word again and write the letter G under every word that means a *game.*

Then look at each word again and write the letter B under every word that means a *book.*

Then look at each word again and write the letter T under every word like *now* or *then* that means something to do with *time.*

Then look at each word again and write the word *good* under every word that means something *good to be* or *do.*

Then look at each word again and write the word *bad* under every word that means something *bad to be* or *do.*

4. camel, samuel, kind, lily, cruel.
5. cowardly, dominoes, kangaroo, pansy, tennis.
6. during, generous, later, modest, rhinoceros.
7. claude, courteous, isaiah, merciful, reasonable.
8. chrysanthemum, considerate, lynx, prevaricate, reuben.
9. ezra, ichabod, ledger, parchesi, preceding.
10. crocus, dahlia, jonquil, opossum, poltroon.

10.5 begonia, equitable, pretentious, renegade, reprobate.

11. armadillo, iguana, philanthropic.

A pupil's score is the value of the most difficult line of words for which he gives four out of five of the meanings correctly. A class score is the value of the line of words for which the average per cent of correct responses is eighty. Thorndike has prepared a table for determining the class score when the per cent of correct responses is not exactly eighty. For details of the method, consult the *Teachers College Record* for September, 1914.

Several thousand copies of the Visual Vocabulary Tests have been disonly relatively few returns have been received. This is probably due to the fact that the administration of the test is less simple than that of the Kansas Silent Reading Tests of the Courtis Standard Research Tests, Series B. So few reports have been received that it has not seemed worth while to give more than a summary of the scores. The cities reporting are:

Biwabik, Minn.
Brookville, Kan.
Durham, N. C.
Ellinwood, Kan.
Fresno, Cal.
Halstead, Kan.
Hinsdale, Ill.
Medicine Lodge, Kan.
Powhattan, Kan.
Talmage, Kan.

Although it appears that this vocabulary test forms a useful supplement to a test of silent reading, if its administration is so difficult that teachers and superintendents do not make use of it, we must look for a more simple vocabulary test.

In Table XIV there are given the median scores for the cities which reported to the Bureau of Educational Measurements and Standards, and for eighteen cities which reported to the Bureau of Coöperative Research at the University of Indiana.[1] The number of pupils in each grade who took the test is given. The two sets of medians agree rather closely, particularly in the upper grades. Professor Thorndike has informed the writer that the reports which he has received have involved so great variations that he has hesitated to issue standards for the test. For this reason, if these median scores are used as standards for purposes of comparison it should be remembered that they are subject to revision.

In both sets there was a considerable variation from city to city, but probably these variations are not greater than have been found when other tests have been given. It will be noted that in both sets there is progress from grade to grade, the progress being more rapid in the earlier grades.

TABLE XIV.

Showing median scores for Visual Vocabulary Tests.

GRADE.	Total for nine cities.		Indiana.	
	Number of pupils.	Median.	Number of pupils.	Median.
III	.....	.....	1,650	4.00
IV	385	4.43	2,095	5.26
V	355	5 30	2,028	6.00
VI	411	6.18	1,860	6.66
VII	354	7.00	1,625	7.29
VIII	168	7.90	1,313	7.91

1. M. E. Haggerty, The Ability to Read: Its Measurement and Some Factors Conditioning It. Indiana University Study, Vol. IV. June, 1917.

CHAPTER VI.

HANDWRITING.

Prepared by J. C. DEVOSS.

This is a report of the measurement of the handwriting ability of school children by teachers using the Ayres Handwriting Scale. This well-known scale consists of specimens of handwriting arranged in order of their quality (legibility). There are three types of samples for each degree of quality: vertical, semislant, and full slant. The qualities are marked 10, 20, 30, and so on up to 90.

When the Bureau of Educational Measurements and Standards undertook the distribution of this scale it was necessary to provide detailed directions for using it and record sheets for tabulating the results. Accordingly the following directions were prepared and furnished with each copy of the scale.

GENERAL INSTRUCTIONS TO TEACHERS.

Obtaining Samples.

1. All pupils should be supplied with two or three sheets of unruled paper of a size approximately 8½ by 11 inches.

2. See that the children of fourth grade and above are provided with pen and ink. Second- and third-grade children may use pencil if not accustomed to pen and ink.

3. When children have paper and pencil, proceed thus: Read aloud a stanza—four lines of the poem, "Mary had a little lamb," etc., which is printed on the other side of this sheet. If you are using these directions for the first time use the first stanza; if the second time, use the second stanza; if the third time, use the third stanza. Have the children recite this stanza aloud in unison until you are sure they all know it. Then ask them to write it once. Collect these copies and destroy them. *Do not tell the children they are to be tested in any way.* Next instruct the children as follows:

I.

5 10 15
Mary had a little lamb,
20 25 30 35 40
Its fleece was white as snow;
45 50 55 60 65
And everywhere that Mary went
70 75 80 84
The lamb was sure to go.

II.

5 10 15 20 25
He followed her to school one day;
30 35 40 45
That was against the rule;
50 55 60 65 70 75
It made the children laugh and play
80 85 90 95 97
To see the lamb in school.

III.

5 10 15 20 25
And so the teacher turned him out,
30 35 40 45
But still he lingered near,
50 55 60 65 70
And waited patiently about
75 80 85 89
Till Mary did appear.

"Write the stanza of the poem which you have learned. Write it just as you would in a composition or in an ordinary school exercise. If you finish the stanza, write it over again, and keep on writing until I tell you to stop. Write on only one side of the paper. We must start together and stop together. Lay your papers on your desk in position. Have pen and ink ready. When I say 'Get ready,' place your hand in position to write, but do not begin to write until I say 'Start.' Then all begin at once. When I say 'Stop' I want you all to stop at once and raise your hands so that I can see that you have stopped."

Now take your watch in hand and when the second hand reaches the 55 second mark say, "Get ready." Exactly at the 60 second mark say, "Start." At the end of three minutes call out, "Stop, hands up." Be sure to allow exactly three minutes. Have each child write name and age on the *back* of paper. Collect the samples at once and put them together.

Rating for Quality.

Preliminary exercise for teachers not familiar with the Ayres Handwriting Scale.

Select ten samples at random. Number these samples and place their numbers on a blank sheet of paper. Now take the first sample and rate it thus: Place the Ayres Scale on a table in full view and in a good light. Determine whether the sample is vertical, medium slant or full slant, like the A, B, or C division of the scale. If it is medium slant pay no more attention to the A and C divisions of the scale. Place the sample directly under the scale division marked 20 and move it along toward 90, comparing it with each division. Decide which division of the scale it resembles most in quality. Then place it under the scale division marked 90 and work back towards 20 in the same row as before. Decide again which division it resembles most in quality. If your two judgments agree, mark the grading on the blank paper opposite the numeral 1. If the two judgments do not agree, compare the sample again with the two divisions of the scale and determine which it most nearly resembles. Proceed to rate the other samples in this manner, keeping the record for each. When you have finished the ten samples, lay this record aside, out of sight. Rate the ten samples a second time, again keeping the records and again laying the records aside. Do this a third time, and when you have finished, compare your three ratings for each of the ten samples. If the three ratings for any one sample vary more than ten, satisfy yourself as to which rating is the correct one, by comparing it with the scale again.

Rating the Samples for Permanent Record.

After becoming familiar with the use of the scale, proceed to rate the samples, working always from 20 to 90 and from 90 to 20, and compare the two ratings as directed in the preliminary exercise. Then record your rating in the upper right-hand corner of the sample. Whenever a teacher suspects that her ratings of samples of handwriting are unreliable she should repeat the preliminary exercise with another set of ten samples selected at random. But the teacher should remember that at best this judgment will be approximate. A variation of one step in the scale does not constitute an unreliable judgment.

Rating for Speed.

For the sample you are rating, multiply the total number of letters in the stanza by the number of times the stanza has been completely written. Consult the printed copy, and from the small numerals determine the number of letters in the unfinished stanza. Add this number to the product obtained as directed above. Record this sum under your rating for quality in the upper right-hand corner of the sample, thus: 70
219

Recording Scores.

The teacher must be careful that her papers are grouped correctly by classes. If she has but one grade of pupils, say fifth grade, or two divisions of one grade, say fifth A and fifth B, then her papers are all grouped together and but one "distribution" made. If, however, she has parts of two or more grades, say part fifth and part sixth, she must fill out a separate record sheet for each division.

Sort the papers from one class on the basis of quality. (For instance, put into one pile all those papers having a quality of 90, into another put all the 80's, into another all the 70's, and so on.) Then, one pile at a time, re-sort the papers in each of these piles on the basis of their rating for speed. (For instance, if there were ten papers of quality 60, whose speeds were, 150, 159, 165, 185, 185, 191, 209, 215, 232, 240, the first three would be piled together, the next four would form a second pile, the next two a third pile, and the last one would be placed by itself.) Next count the number of papers in each of these piles and record the numbers in the proper vertical column of the table. (In our illustration this is the column under 60. There are three papers in the pile whose speeds are 150-179. Place a figure 3 in the 60 column and directly opposite the numerals 150-179. There are four papers in the pile whose speeds are 180-209. Hence a figure 4 is to be placed in the 60 column and opposite the numerals 180-209. Each of the other piles is to be treated in the same way.)

When all the scores have been entered, find the sum of the figures in each vertical column and in each horizontal row. If your records have been accurately made, the sum of the horizontal totals will just equal the sum of the vertical totals.

Computing Class Medians.

Do not study this until you have recorded the scores.

A median is a mid-measure—the measure such that there are just as many scores larger as there are smaller.

In order that you may compare your class with other classes find the approximate median for speed and qualify as follows:

1. Find half of the total number of scores. For example, if the total is 28, the half is 14. If the total is 27, the half is also 14.

2. To find the class median for quality, begin at the left of the row of totals for quality. (This is at the bottom of the record sheet.) Add the totals until the sum is equal to the half sum which you have found, or until the addition of the next total would exceed the half sum. The approximate class median is the quality which stands at the top of the next column.

3. The approximate class median for speed is found in the same way, beginning at the top of the totals at the right of the record sheet. The same half sum is used. The approximate median for speed will be the first of the two numbers expressing the number of letters written in three numbers, and will always end with a cipher.

4. When you have found the approximate class medians, record them in the spaces at the bottom of the record sheet.

5. Directions for computing the true medians are found in Folder D which accompanies the Research Tests in Arithmetic. When there are

fewer than 15 pupils in a class the distribution of the pupils' scores furnishes a better basis for evaluation than the medians. In case the true medians are desired the Bureau of Educational Measurements and Standarde is prepared to furnish them upon request.

For tabulating the scores of a class, the class record sheet as shown in Fig. 8 was devised. Duplicate copies of this class record sheet were sent to the Bureau of Educational Measurements and Standards.

FIG. 8.

Class Record Sheet for Handwriting.

BUREAU OF EDUCATIONAL MEASUREMENTS AND STANDARDS,
KANSAS STATE NORMAL SCHOOL, EMPORIA.

CLASS RECORD SHEET—HANDWRITING USING THE AYRES SCALE.

City..... *School*..... *Grade*.....

Teacher..... *Date*.....*191*...

DISTRIBUTION OF PUPILS' SCORES.

Number of letters written in three minutes.	Quality.								Total for speed.
	20	30	40	50	60	70	80	90	
Below 30									
30 to 59									
60 to 89									
90 to 119									
120 to 149									
150 to 179									
180 to 209									
210 to 239									
240 to 269									
270 to 299									
300 to 329									
330 to 359									
360 to 389									
390 to 419									
420 to 449									
Over 450									
Total for quality									

Approximate class medians: Quality..... Speed (letters per 3 min.).....

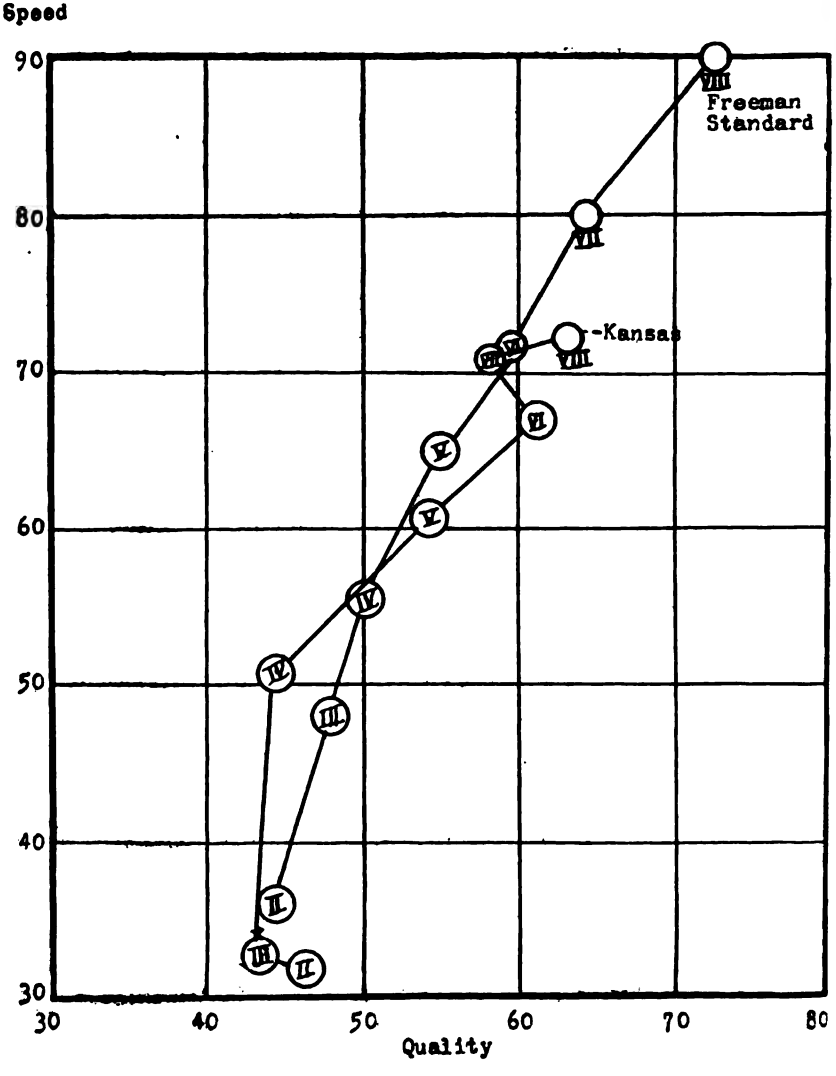
True median: Quality..... Speed (letters per 3 min.)..... Stanza used.....

This report is based upon the reports of scores from sixteen cities—twelve in Kansas and four in other states. The median scores for each of these cities in both speed and quality of handwriting are given in Table XV. In this table it will be noted that there is considerable varia-

bility in the median scores from city to city. This is, of course, exactly what has been found in other tests, and it is not at all surprising that it existed in the case of handwriting. In the case of handwriting it is particularly likely to happen, because teachers differ widely in respect to the amount of relative emphasis which they place upon the two factors, speed and quality. The irregularities from grade to grade in a city are due in a large part to varying relative emphasis upon these two factors.

FIG. 9.

Showing Kansas median scores in handwriting in comparison with standard medians.



In Table XVI the median scores for large groups of the children and the standards proposed by Freeman are given. In this table it will be noted that while the Kansas medians are below the medians proposed by Freeman, they compare favorably with the medians for the other groups of pupils.

In Fig. 9 the median scores for Kansas and the standards proposed by Freeman are represented graphically. The position of the small circle represents the scores for the grade indicated by the small Roman numerals. It will be noticed that the curve which represents Freeman's standards is regular and therefore represents systematic progress. On the other hand, the curve which represents the median scores for Kansas is irregular and represents unsystematic progress. In general the third-grade pupils write no better than the second-grade pupils; in fact, they are slightly below in quality and they increased their speed only three letters per minute. The growth from the third to the fourth grade is entirely in speed. From the fourth to the sixth grade the growth is regular, but the curve of progress from the sixth to the eighth grade is again irregular.

The fact that the progress of pupils is irregular is significant. It indicates that there is no definite course of study in handwriting. This graph represents the medians for twelve Kansas cities, but if we examine the medians for the several cities it will be found that similar irregularities exist. This lack of a systematic plan is probably due to the fact that in the past it has not been possible to write a course of study in definite terms. Courses of study have been written merely in terms of subject matter and not in terms of results. A number of courses of study and some handwriting supervisors failed to recognize speed in the aim of handwriting. The standards proposed by Freeman furnish a means whereby a definite purpose may be stated for the teaching of handwriting.

The standards proposed by Freeman were determined upon after an elaborate study of the handwriting of school children and an investigation of the handwriting of parents in a number of adults' activities. The fact that they are higher than a number of median scores given in this table suggests that possibly they may be too high.

Ayres[1] and Ashbaugh[2] have drawn certain conclusions from the requirements in handwriting which are set up by the examiners of the Municipal Civil Service Commission of New York City. Ashbaugh quotes a letter from the acting director of the commission as follows:

"I find that the Municipal Civil Service Commission of New York ordinarily uses the standard of 70 per cent as a passing grade in handwriting, but for positions where handwriting is a special requirement the standard is sometimes set at 75 per cent.

"Ayres has shown that the ratings of 70 per cent and 75 per cent, as given by the commission, correspond respectively to scores of 40 and 50 on the Ayres scale. Since this commission recommends many persons

1. Ayres, L. P. A Scale for Measuring the Quality of Handwriting of Adults. Russell Sage Foundation, Bulletin E 138.

2. Ashbaugh, Ernest J. Handwriting of Iowa School Children. Bulletin of the University of Iowa, March 1, 1916.

who can not write better than the 40 specimen of the Ayres scale, and recommends others who write only as well as the 50 specimen, for positions where handwriting is a special requirement, it would follow that an ability to write as well as 50 on the Ayres scale would be sufficient for all the demands which many pupils will meet.

"There is another obvious demand on the pupil's ability to write. This is the demand made by the high schools and colleges. We have but little data on this point, but many come to high schools unable to write rapidly enough for the demands placed upon them. They then often sacrifice the quality of their handwriting for the sake of greater speed. Lewis[3] examined the handwriting of 1760 third- and fourth-year students of 166 Iowa normal training high schools. He found their median score for quality to be 59.1 on the Ayres scale, with a range from 34 to 89. Fifty per cent of the scores fell between 53.6 and 64.3. The average speed of their handwriting was ninety letters per minute. Thus they rank with the seventh-grade standard for quality and the eighth-grade standard for speed. Comparing their scores with those of many eighth-grade children, as shown in Tables XXII and XXIII, these high-school pupils write from ten to fifteen letters per minute faster, but no better than the average eighth-grade pupil. These data bear out the statement that the higher schools require greater speed of handwriting than the training of the elementary schools has furnished."[4]

In Tables XVII and XVIII the median scores in speed and quality are given for six buildings in City LXXI. It will be noted that there is a lack of uniformity of the handwriting results obtained from the different buildings of this city. For example, the speed of handwriting in the fourth grade varies from 29 to 73 letters per minute. In quality the variation is not as great, but there is a considerable variation. This condition shows a lack of adequate supervision. Now that it is possible to state the results to be obtained in handwriting in objective terms, such conditions as are shown to exist in this city should be remedied.

The reliability of the scores is an important consideration. The measurement of speed is objective, and unless the pupils have written at an unnatural rate the scores for speed may be considered to be very reliable; at least they are an accurate measure of the speed at which the sample was actually written.

The case of quality is different. The quality of a sample of a pupil's handwriting is determined by comparing the sample with the scale and assigning to it the value of the scale specimen which the pupil's sample most nearly resembles. In deciding which specimens the sample most nearly resembles there is opportunity for difference of opinion, and experience has shown that teachers do differ in their judgment with reference to this. The specimens upon which this report is based were rated for quality by the classroom teachers. In general, these teachers were inexperienced in using the scale, although the directions which accompany

3. Lewis, E. E. The Present Standard of Handwriting in Iowa Normal Training High Schools; in Educational Administration and Supervision, Vol. 1, pp. 663-671. (December, 1915.)

4. Monroe, Walter S. Educational Tests and Measurements, chapter on Handwriting. (Houghton Mifflin Co.)

the scale (see page 56) recommended a plan of training. In order to determine the reliability of teachers' ratings, those using the scale were asked to send not only a report of the scores, but the samples of pupils' handwriting, to the Bureau of Educational Measurements and Standards. The writer trained himself until he found that in rating the same samples the successive ratings were consistent. He then rated 2733 samples which had been previously rated by teachers. The distribution of scores for these samples is given in Table XXI. The distribution of the scores assigned approximately these same specimens by the classroom teacher is given in Table XXII. Comparing these two tables, it will be noticed that the scores given by the classroom teachers are distinctly higher than those given by the trained judge. This may be because the class teacher was not an impartial judge; it may be because the trained judge assigned scores which were too low. However, in interpreting the median scores given in Table XV it should be borne in mind that possibly the median scores for quality are higher than they should be.

This study of the reliability of teachers' ratings will be reported on in more detail at another time. At this time space forbids more than these few tables and this brief comment.

In Table XIX the distribution of individual scores for quality for twelve Kansas cities is given. This distribution shows a very striking fact. In every grade there are some pupils whose handwriting corresponds to each division of the scale; that is, there are some second-grade pupils who write as well as quality 90 and some eighth-grade pupils who write as poorly as quality 20.

In Table XX there is given the distribution of the corresponding scores for speed. Here also the degree of overlapping of successive grades is very great. It is probable that some of this overlapping is due to the lowering of speed to produce a high quality, or the reverse. Similar overlappings have been found to occur in the case of other school subjects, and it is not surprising that we find it in the case of handwriting. It is not probable that all overlapping can be eliminated, but it does seem that adequate supervision and more effective instruction would reduce it materially.

The Ayres Handwriting Scale is an instrument for general measure. For the purpose of more detailed measurement or diagnosis of the quality of handwriting the Bureau of Educational Measurements and Standards has supplied the Freeman Handwriting Scale.

DESCRIPTION OF SCALE.

There are five charts in the Freeman Handwriting Scale. Each chart represents three degrees of excellence. On chart No. 4 the lowest degree is numbered 2, and the others 6 and 10, respectively. On the other charts these numbers are 1, 3, and 5, respectively.

Chart 1 represents three degrees of uniformity of slant. Lines drawn parallel to the down stroke of the two or more space letters show the

5. In distributing the Freeman Handwriting Scale, the Bureau of Educational Measurements and Standards furnished with it a sheet of transparent paper on which the alignment and slant gauge were printed. The slant gauge consisted of three sets of parallel lines which represent the different degrees of slant. The alignment gauge consisted of two horizontal parallel lines.

parent paper on which alignment and slant gauges are drawn.[5] If the series of parallel lines on the slant gauge which most nearly resemble the slant of the sample of the handwriting to be judged is placed above the writing the degree of variation can be estimated by comparison with these lines. It may be noticed that the amount of difference between ranks 1 and 3 is greater than that between ranks 3 and 5. This is true also of Chart II.

The average deviation from uniformity of the samples in Chart I is given in the margin to the left of each sample under the caption "M. V." The amount is given in degrees.

Chart II represents three degrees of uniformity of alignment. This is measured with reference to the tops and bottoms of the one-space letters. The degree of deviation was calculated on the basis of the average deviation in the distance of these points from a straight base line. The average deviation for each sample of the scale is given in the left margin. The alignment gauge on the transparent paper will aid in judging when placed over the specimen to be judged. It must be noted that deviations in alignment are more noticeable when the letters are close together than when they are spread far apart. This error must be consciously guarded against.

Chart III shows the quality of the line or stroke. The stroke should be smooth, firm and even. On the right side of the chart letters are shown enlarged, so that defects of line may be more readily seen. This suggests that in judging a sample a reading glass will be of considerable assistance. In any case the enlarged letters assist by fixing the attention on the defects, after which they are more readily detected in the original. Quality of line is important, as it indicates something of the character of the movement and affects the beauty and legibility of the writing.

We may note that these three classes of defects—that is, defects in uniformity of slant and alignment, and in quality of line or stroke—are due to lack of coördinations, or cramped muscles. This may be readily seen by noting the cause of defects 1, 2, 3, 4, and 5 in Table I. Improvement in these must come by the acquirement of an easy, fluent, regular movement. In correcting defects here, attention must be called to the movement, while the defects shown in the succeeding tables are to be corrected by calling attention to the letters and words. Both in diagnosis and in remedial drills this distinction must be kept in mind.

Chart IV shows the forms of letters. The values 2, 6, and 10 on this chart, in place of the values 1, 3, and 5 of the other chart, show Freeman's judgment that letter formation is more important than any other one feature in its influence both on beauty and on legibility. Another evaluation of each of the samples in terms of the scale of per cent, based on a range of 0 to 100, is given in the margin at the left.

Types of Illegible Forms of Letters Described. The types of illegible forms of letters which should be counted as errors are described by

5. In distributing the Freeman Handwriting Scale, the Bureau of Educational Measurements and Standards furnished with it a sheet of transparent paper on which the alignment and slant gauge were printed. The slant gauge consisted of three sets of parallel lines which represent the different degrees of slant. The alignment gauge consisted of two horizontal parallel lines.

Freeman on page 133 of the "Teaching of Handwriting." A figure illustrating them is found on page 135 of the same book. Only a suggestion of the types is given here. These are the gross errors which occur only in the most careless writing.

1. A loop left open which should be closed, or a loop closed which should be left open, as in letters *a*, *d*, *f*, *g*, *s*, and *v*.

2. A stroke running higher or lower than it should, as in *b*, *f*, *k*, *l*.

3. Part of the letter is slurred over, which causes it to lose its characteristic form.

4. Substitution of angles for curves and curves for angles, as in *m*, *n*, *w*.

5. Substitution of loops for return strokes along the same line or the reverse, as in *c*, *d*, *e*, *f*, *i*, *t*, etc.

6. Substitution of a return stroke for an open curve, or an open curve for a return stroke, as in *r* and *y*.

7. A stroke may be faulty in direction or misplaced, as in *t*, *u*, *x*, etc.

8. Small letters and capitals are often confused because of their size, as in *a*, *c*, *g*, *m*, *n*, etc.

As a general principle, no letter should vary from its conventional form in such a way that it is likely to be confused with another letter or to lose its characteristic form.

Consistency of letter formation should also be emphasized; that is, while we are not attempting to choose between different types of script, we must insist that the letters conform to the type selected by pupil or teacher.

Chart V shows different kinds of spacing. Here attention is drawn to spacing between words and between letters. (The spacing between lines may be judged without a scale.)

The faults of most importance are: (1) crowding of letters; (2) spreading letters too far apart; (3) crowding the words.

Specimens may show one or more of these faults. In the chart those specimens which have one fault are placed in the middle rank and those which have two are placed in the lower rank.

For using the Freeman scale the Bureau of Educational Measurements and Standards prepared the following instructions:

OBTAINING SAMPLES.

The instructions for obtaining samples given on our class record sheet for the Ayres scale should be used in collecting samples for analysis with the Freeman scale. In obtaining samples for the succeeding trials the same directions should be used with this addition. All those children who were below the standard in speed should be urged to write at the standard rate. It must be remembered that the proposed standards of quality are the qualities which should be produced while writing at standard speed. Until we have further data the teacher must decide whether the pupil should be first drilled in producing quality and then drilled in producing speed, or whether he must be drilled at one time for the production of both quality and speed. In either case our aim

must be to secure samples written at standard speed. To secure this the pupil should not be disturbed while he is writing the sample. The samples should be collected and scored for speed first. If a pupil has written at a speed much below the standard, another sample of his handwriting should be secured. In securing this the teacher should tell him that he must write faster. If any have written at a speed much above standard but low in quality, they should be tested again after being directed to write more slowly.

ANALYZING SAMPLES.

It is assumed that teachers using the Freeman scale have collected samples and rated them, using the Ayres scale according to our directions. The teacher should then take the samples of handwriting having scores below the standard in speed and quality. (Standards are given on the class record sheet, and on this sheet, under the heading "Evaluation of scores.") These samples should then be examined carefully by comparison with the Freeman chart, using the tranparent paper as directed above. The results of this examination should be recorded at the top of the paper on which the sample is written and on the individual record cards under the head of "First trial." The samples of handwriting should then be filed for future reference. A sample of handwriting might be scored and recorded as follows:

Chart I (uniformity of slant)	3
Chart II (uniformity of alignment)	2*
Chart III (quality of line)	2*
Chart IV (letter formation)	6
Chart V (spacing)	4*
Total value on Freeman scale	17

When the teacher has analyzed the handwriting of all her pupils who are below standard, she should recommend corrective drills. The pupil's interest may be stimulated by showing him his progress by comparison with the charts from time to time.

These drills should be used until there is improvement. The minimum time should be the equivalent of at least a half dozen writing lessons, but this time will vary with classes. After this the teacher should collect another set of samples, using the same stanza of the poem and following the instructions given on our class record sheet. This second set of samples should be scored with the Ayres scale. Use the Freeman scale to analyze the handwriting of those pupils who were below standard when the first samples were collected.

The scores should be recorded under "Second trial" on the individual record card. (See Fig. 10.) The comparison of the pupils' second scores with those of the first trial will furnish a basis for further remedial drills and practice. After another interval of drill a third set of samples should be collected from those pupils who were not up to standard at the time of the "second trial." These samples should be analyzed and the scores recorded as before. If a fourth trial is necessary or seems

* The intermediate numbers 2 and 4 may be used when the sample to be judged seems to belong about midway between the ranks above and below it.

advisable, use the second stanza of the poem. There may be a few cases in which a fifth or even a sixth trial may seem advisable. In such cases use a second individual record sheet and change the headings to indicate the fifth, sixth, etc., trials. There should be about the same amount of practice between successive trials as there was between the first and second trials. After a pupil's record shows that he has achieved the standard of his grade there is no need of carrying the record farther unless he relapses.

FIG. 10.—*Showing Individual Record Card for use with the Freeman Handwriting Scale.*

INDIVIDUAL RECORD CARD.

HANDWRITING—*Using the Freeman Scale.*

TO THE TEACHER: Please answer the following questions and add any information which you think will be of assistance in determining the value of the Freeman scale.

1. What is the average time (in minutes) per week which this pupil has spent in practice since first trial?

.....

2. What corrective drills were prescribed?

.....

.....

.....

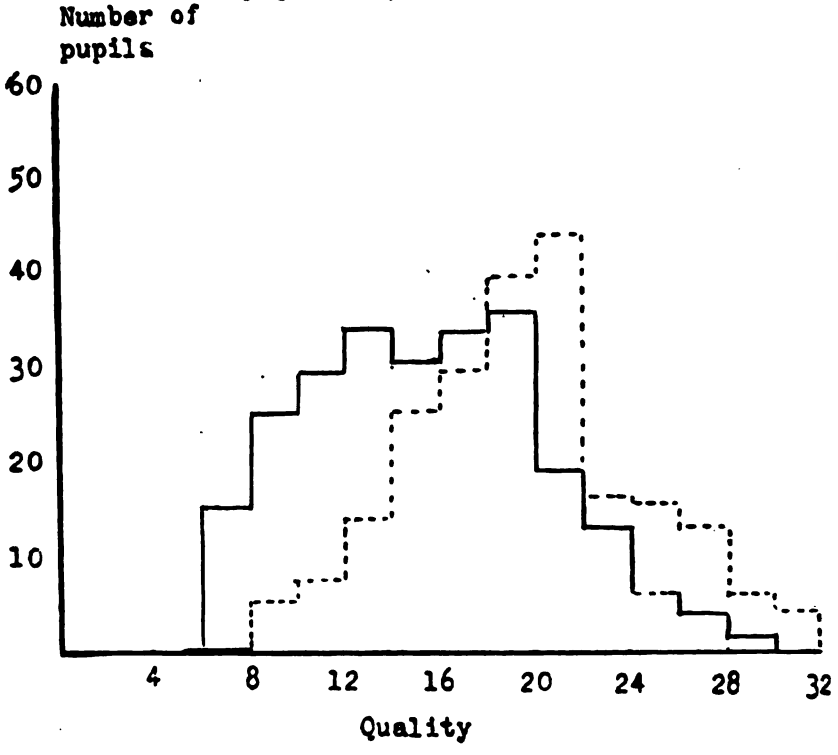
Pupil's Name..... *City*.....

	First Trial. Date.....	Second Trial. Date.....	Third Trial. Date.....	Fourth Trial. Date.....
Chart I (Slant)				
Chart II (Alignment)				
Chart III (Quality of line)				
Chart IV (Letter formation)				
Chart V (Spacing)				
Total Value on (Freeman scale)				
Quality Value on (Ayres scale)				
Speed (Letters per minute)				

Teacher.....
Grade..... Age.....
Building.....

FIG. 11.

Showing distribution of scores for two measurements of handwriting in a city by means of the Freeman Scale.



At a future date it is hoped to make a more complete report of the use of the Freeman scale. At this time the report is of its use in only one city. In Table XXIII is shown the distribution of speed and quality for the handwriting in one city according to measurements made in December, quality being measured by means of the Freeman scale. In Table XXIV a similar distribution is given for the measurement of handwriting in the same city in March. The distributions in quality in these two cities are represented graphically in Fig. 11. It will be noticed in this graphical representation that a very marked improvement in quality was made by those pupils who were rated low in December. By referring to the tables, it will be found that this improvement in quality was not secured at the expense of speed, because there was some general increase in speed during this period. If the use of the Freeman scale made this improvement possible, we have evidence of its worth. It seems reasonable to expect that when the attention of the teacher and pupils is called to the specific defects in handwriting that instruction will be more effective. There is then hope for the instruction to be directed toward the correcting of specific defects.

TABLE XV.—*Showing the class median for twelve Kansas cities and four cities in other states.*

CITY.	Quality.							Speed.						
	II.	III.	IV.	V.	VI.	VII.	VIII.	II.	III.	IV.	V.	VI.	VII.	VIII.
III	64	48	61	53	68	60	58	23	40	53	67	78	70	76
VIII	41	38	45	47	65	60	52	32	30	47	52	39	56	98
IX	38	.....	43	44	56	65	.....	31	.....	58	72	78	59	.....
XXII	36	32	38	45	43	48	66	24	35	46	47	59	63	59
XXIX	.....	43	28	60	50	.....	.....	.....	28	33	55	73	.....	.....
XXX	39	33	39	44	53	56	.....	32	54	68	72	82	89	.....
XXXI	48	45	49	54	55	42	52	32	38	51	67	75	92	96
XLI	.....	.....	.....	.....	42	46	66	.....	.....	.....	.....	83	92	88
XLIX	57	45	50	63	74	70	73	27	41	33	53	48	74	78
LVIII	51	60	54	67	70	.....	75	28	49	55	64	65	.....	60
LXX	39	52	56	58	48	59	64	29	46	57	60	73	83	79
LXXI	46	43	44	53	62	59	58	36	51	57	61	70	82	65
LXXIV	.....	46	48	54	59	71	71	.....	40	47	55	54	60	51
LXXV	.....	.....	50	58	65	69	75	.....	.....	54	60	61	77	74
LXXVII	38	36	42	45	56	59	70	29	29	70	92	63	65	87
XCI	.....	.....	.....	.....	.....	80	81	.....	.....	.....	.....	.....	60	60
Total medians	45	43	43	53	61	58	60	31	35	51	61	67	70	72
Total pupils	740	761	880	1,011	1,121	606	562	740	761	880	1,011	1,121	606	562

TABLE XVI.

Showing median scores.

QUALITY.

	II.	III.	IV.	V.	VI.	VII.	VIII.	No. of pupils.
Kansas medians	46	43	44	54	61	58	63	5,681
Cleveland*				45	48	50	55	25,387
Iowa†	35.7	39.8	44.5	49.1	52.3	57	61	28,000
Starch standards‡	27	33	37	43	47	53	57	1,740
56 cities**	39.7	42	45.8	50.5	54.5	58.9	62 8	34,000
Freeman standards	44	47	50	55	59	64	70	

SPEED.

Kansas medians	32	35	51	61	67	71	72	5,681
Cleveland*				60	70	76	80	25,387
Iowa†	39.2	49.2	61.9	65.5	72.6	75	76 5	28,000
Starch standards‡	31	38	47	57	65	75	83	1,740
56 cities**	30.6	43.8	51.2	59.1	62.8	67.9	73	34,000
Freeman standards	36	48	56	65	72	80	90	

* Charles H. Judd, Measuring the Work of the Public Schools. Survey Committee of the Cleveland Foundation.

† E. J. Ashbaugh, Handwriting of Iowa School Children. University of Iowa, Extension Division, Bulletin No. 15, March, 1916.

‡ D. Starch, The Measurement of Efficiency in Reading, Writing, Spelling, and English. University of Wisconsin, 1914.

** F. N. Freeman, Fourteenth Yearbook of the National Society for the Study of Education. Part I.

TABLE XVII.

Showing median scores in speed for six buildings in City LXXI.

SCHOOLS.	II.	III.	IV.	V.	VI.	VII.	VIII.
L	27	49	73	71	76		
W	32	55	47	75	74		
D			29	55	82		89
M	51	36	51	53	68	85	
G	32	63	73	67	65	83	
H							81
City median	39	51	57	61	73	84	85

TABLE XVIII.

Showing median scores for quality for six buildings in City LXXI.

SCHOOLS.	II.	III.	IV.	V.	VI.	VII.	VIII.
L	62	46	49	55	62	.....	.....
W	45	46	44	53	57	.....	.....
D	.....	.....	35	41	57	46	50
M	44	41	42	56	67	65	.....
G	33	38	42	42	58	56	.....
H	.....	.....	.....	.....	.....	.....	58
City median	46	43	44	53	62	58	58

TABLE XIX.

Distribution of individual scores for quality, twelve Kansas cities, based on teachers' ratings.

QUALITY.

GRADE.	20	30	40	50	60	70	80	90	Total.	Median.
II	96	179	180	116	89	48	24	8	740	45
III	116	207	179	115	90	37	13	4	761	43
IV	89	203	235	187	116	40	8	2	880	43
V	48	157	209	243	206	108	28	12	1,011	53
VI	21	96	177	250	275	177	93	32	1,121	61
VII	29	91	90	117	138	76	56	9	606	58
VIII	17	43	72	89	128	108	90	15	562	60
Totals	416	976	1,142	1,117	1,042	594	312	82	5,681	53

TABLE XX.—*Showing distribution of individual scores of speed, twelve Kansas cities, based on teachers' ratings.*

SPEED IN LETTERS PER MINUTE.

GRADE.	0 to 9.	10 to 19.	20 to 29.	30 to 39.	40 to 49.	50 to 59.	60 to 69.	70 to 79.	80 to 89.	90 to 99.	100 to 109.	110 to 119.	120 to 129.	130 to 139.	140 to 149.	Over 150.	Total.	Median.
II	6	75	270	173	129	63	12	7	5	.....	.....			.....	.....	.....	740	31
III	4	31	145	147	166	148	65	35	11	3	2	3		.....	1	.....	761	35
IV	.....	8	59	113	173	238	124	66	58	25	8	8		.....	.....	.....	880	51
V	.....	1	20	46	142	266	222	148	107	27	16	6	6	1	3	.....	1,011	61
VI	.....	4	27	45	103	232	217	206	161	82	35	9		.....	.....	.....	1,121	67
VII	.....	1	3	14	21	76	99	92	131	89	43	28	6	1	1	1	606	70
VIII	.....	2	14	48	92	82	8	89	78	56	19	11	4	.....	.....	.....	562	72
Totals	10	122	538	586	826	1,105	747	643	551	282	123	65	16	2	5	1	5,681	56

TABLE XXI.

Showing distribution of scores for quality of handwriting as scored by a trained judge on the Ayres scale.

QUALITY.

GRADE.	20	30	40	50	60	70	80	90	Total.	Median.
II	127	159	98	29	8	1	.....	.....	422	35
III	108	182	167	53	20	1	.....	.....	531	38
IV	96	145	88	29	14	7	.....	.....	379	36
V	78	150	169	82	30	16	2	.....	523	42
VI	28	98	196	94	40	15	4	.....	475	46
VII	16	86	109	57	44	11	4	.....	327	46
VIII	6	11	28	19	6	4	1	1	76	44
Totals	454	831	855	364	162	55	11	1	2,733	40

TABLE XXII.

Showing distribution of scores for quality of handwriting as scored by the classroom teacher. This table is based upon approximately the same specimens as table XXI.

QUALITY.

GRADE.	20	30	40	50	60	70	80	90	Total.	Median.
II	67	115	126	71	44	16	4	1	444	43
III	92	170	143	74	49	17	4	.....	549	40
IV	45	99	113	100	61	19	4	1	442	46
V	19	74	139	137	108	44	13	.....	534	51
VI	10	45	75	116	119	74	33	14	486	59
VII	20	57	45	69	80	50	27	.....	348	57
VIII	11	27	36	45	40	37	34	3	233	59
Totals	264	587	677	612	501	257	119	19	3,036	49

TABLE XXIII.—*Showing the distribution of speed and quality as measured by the Freeman scale in one city. Measurements made in December.*

SPEED.	QUALITY.																							
	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	Totals.
20 to 29	1	5	....	5	5	10	3	5	3	6	4	8	....	9	1	2	....	1	....	....	....	....	....	....	68
30 to 39	....	2	1	7	1	1	1	2	....	1	1	....	....	2	1	2	....	1	....	....	1	....	....	....	23
40 to 49	....	4	1	3	3	4	2	12	1	10	2	8	1	7	1	3	1	2	....	5	....	....	....	1	71
50 to 59	....	4	1	8	2	10	1	8	4	7	....	6	4	9	2	4	2	6	1	3	....	3	....	1	86
60 to 69	....	3	1	3	1	4	1	6	2	3	....	12	2	8	....	8	2	3	....	2	....	1	....	1	63
70 to 79	....	5	1	2	2	4	2	6	....	9	3	4	2	10	4	6	1	5	....	1	....	2	....	....	69
80 to 89	....	1	....	4	1	10	1	10	3	10	3	13	....	9	3	4	1	7	....	1	....	....	....	....	81
90 to 99	....	....	....	2	....	3	....	4	....	1	1	3	....	2	1	1	....	....	....	....	....	....	1	....	19
100 to 109	....	....	....	....	....	....	....	1	....	....	....	....	....	2	1	....	....	....	....	....	....	....	....	....	4
110 to 119	....	1	....	....	....	....	....	1	....	1	....	....	2	....	....	....	....	....	....	....	....	....	....	....	5
120 to 129	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Totals	1	25	5	35	15	46	11	55	13	48	14	54	11	58	14	30	7	25	1	12	1	6	1	3	490

TABLE XXIV.—*Showing the distribution of speed and quality measured by the Freeman scale for the same city as in Table XXIII. Measurements made in March.*

SPEED.	QUALITY.																								
	5.	6.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	30.	Total.
20 to 29	....	....	2	....	1	....	2	....	7	2	3	....	6	4	5	1	2	....	2	....	3	....	....	....	40
30 to 39	....	....	2	1	2	....	3	....	8	2	5	....	11	1	15	2	3	....	7	....	5	....	....	....	67
40 to 49	....	1	....	3	....	....	4	2	3	1	8	2	12	....	12	....	6	....	1	1	4	....	1	....	61
50 to 59	....	....	....	....	1	1	4	1	9	3	10	1	13	....	12	1	2	....	4	2	4	....	2	....	70
60 to 69	1	....	....	....	2	2	2	....	8	1	7	....	11	3	13	1	7	....	5	....	1	....	4	1	69
70 to 79	....	....	2	1	2	1	2	2	3	....	5	2	5	3	12	1	6	....	5	....	3	1	2	2	60
80 to 89	....	....	....	....	2	....	1	4	4	....	2	6	3	2	8	2	3	1	3	1	2	....	2	4	50
90 to 99	....	....	....	....	1	....	....	....	....	....	4	1	3	....	2	....	1	2	....	....	3	....	1	1	19
100 to 109	....	....	....	....	....	....	....	....	....	....	2	1	2	....	....	....	1	....	....	....	....	....	....	....	6
110 to 119	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	1	....	....	....	3
Totals	1	1	6	5	11	4	18	9	42	9	46	13	66	13	80	8	31	3	28	4	26	1	12	8	445

CHAPTER VII.

ALGEBRA.

For the measurement of achievement in algebra a series of six tests has been devised by Walter S. Monroe. In devising these tests the position was taken that the operations which are fundamental to elementary algebra are those which are involved in the solution of equations. This series of tests has to do only with those operations which are involved in the solution of simple equations involving fractions with numerical denominators.

The nature of the tests is illustrated by the following samples:

TEST I.—*Multiplication.* One minute:

$$4(3x-4)=$$
$$-5(-4+6x)=$$

TEST II.—*Reduction to a Common Denomination.* Three minutes:

$$-\frac{7x-2}{6}+\frac{x+1}{8}=$$

$$-\frac{-3+2x}{5}+10-3(2x+4)=$$

TEST III.—*Division.* One minute:

$$-15x=-4$$
$$8x=-12$$

TEST IV.—*Transposition.* One minute:

$$-4x+5=3x-5$$
$$31x-42x+77=43$$

TEST V.—*Collecting Terms.* Two minutes:

$$-7x-3x-6+4$$
$$61x-70x+39-66$$

TEST VI.—*Solving Equations.* Twelve minutes:

$$-\frac{3x-2}{4}=\frac{x+2}{6}$$

$$7x-5\frac{6x-11}{3}=12$$

Other series of tests have been devised according to different principles. One series which has considerable merit has been devised by Rugg and Clark.[1] The authors of these tests have assumed that the fundamental operations of elementary algebra are those which form the topics in our present textbooks. On the basis of this assumption they have devised a series of sixteen tests to measure ability in sixteen topics.

The Standard Research Tests in algebra possess certain defects which are obvious to any one who studied them carefully. Chief among these is the inequality of the exercises in certain of the tests. However, the effect of this inequality has been considerably lessened by employing the cycle principle. By this principle each form of example recurs at

1. See *School Review* for February and March, 1917.

regular intervals. These tests have been given in the following cities, which reported their scores to the Bureau of Educational Measurements and Standards:

Boonville, Mo.
Claflin, Kan.
Clinton, Ill.
Eureka, Kan.
Garden City, Kan.
Horton, Kan.
Independence, Iowa.
Kansas City, Kan.
Kansas City, Mo.
Lawrence, Kan.
Levan, Utah,
Manhattan, Kan.
Milford, Utah.
Moline, Ill.
Mullan, Idaho.
Nephi, Utah.
Ottawa, Kan.
Payson, Utah.
Peabody, Kan.
Preston, Kan.
Spring Hill, Kan.
Superior, Neb.
Valley Falls, Kan.
Wellsville, Kan.

In Table XXV there are given the median scores for the cities making reports to the Bureau of Educational Measurements and Standards. The upper part of the table gives medians for first-year high-school pupils. At the bottom of the table are a few reports for second-year high-school pupils. As will be noticed from the dates, these tests were given toward the close of the school year. We may then think of the medians as representing the achievement of pupils completing the work of the respective years. These tables furnish a few very striking variations from city to city. For example, there are several instances of a median accuracy of 100 per cent. This of course is possible and means simply that half or more of the pupils did all of the examples correctly. In City XXI the median speed in Test III is very high. This as well as other extreme medians have been checked and found to be correct in so far as could be ascertained from the class record sheets.

The Standard Research Tests in Algebra, with a few minor changes, were incorporated in a series of twelve tests published by the Bureau of Coöperative Research of the University of Indiana. In the report of the Third Conference of Educational Measurements, Professor Childs has published a report upon this series of tests.[1] In Table XXVI there are given the scores for Indiana in comparison with the Kansas scores. (By Kansas scores we refer to the median of all scores reported to the Bureau of Educational Measurements and Standards. As the list of cities shows, a number of these cities are not in Kansas.) The report for Indiana is based upon 367 pupils in 10 cities.

Comparisons with this table must be made with caution, because the tests used in Indiana were not identical with those used in Kansas. However, in a number of respects the Kansas medians are sufficiently above the Indiana medians to be significant.

The low degree of accuracy is conspicuous in both sets of medians. This is particularly significant in the case of Test VI, which measures the ability of pupils to solve simple fractional equations. By referring to Table XXV we find that the median per cent of equations solved correctly in the several cities ranges from eight to sixty-seven. It must be admitted that in solving a simple equation, error in any step makes the final result wrong, but it seems appropriate to question the efficiency

1. Bulletin of the Extension Division, University of Indiana, Vol. 2, No. 6.

of instruction which trains pupils so that they are able to do correctly only one simple equation out of three. It is difficult to understand how these pupils can work effectively in dealing with the problems of algebra. It is certain that they are working under great handicap.

In two different studies[2] the test papers have been analyzed to determine the type of errors which pupils make. In both of these studies it has been found that the errors have been made in doing very simple things—so simple, in fact, that it would seem that one would be justified in saying that the errors were errors of carelessness. The use of signs is the most prolific source of error. This is particularly true when a miuns sign precedes a sign of aggression, as $-3(4x-5)$ and $-\frac{3x-7}{5}$ The latter case seems to be the most difficult. The second most prolific source of error is the operations of arithmetic. Pupils very frequently make mistakes in addition, subtraction and multiplication. A considerable number of errors are due to the omission of terms, and other errors to copying. Frequently students will write the coefficient and omit the letter.

In view of the low per cent of accuracy and the nature of errors, it seems obvious that more attention should be given to drill upon specific details. In general, teachers of algebra have not shown the same patience and attention to details that teachers of arithmetic have.

2. Monroe, Walter S. A Test of the Attainment of First-year High-school Students in Algebra; in *School Review*, March, 1915.
Rugg, H. O., and Clark, J. R. Standardized Tests and the Improvement of Teaching in First-year Algebra; in *School Review*, February and March, 1917.

TABLE XXV.—*Showing class medians for Standard Research Tests in Algebra.*

FIRST YEAR.

City.	Date.	Speed.						Accuracy.					
		I.	II.	III.	IV.	V.	VI.	I.	II.	III.	IV.	V.	VI.
I	3–16	15.4	5.3	12.0	10.0	11.0	8.3	96	57	90	100	79	28
II	3–16	10.3	5.4	8.8	7.9	10.3	7.4	100	7	84	82	56	8
III	3–16	14.1	6.7	10.0	10.6	12.0	9.4	96	53	100	100	75	33
III	2–17	12.7	5.3	8.4	10.6	10.1	8.3	98	60	100	92	83	51
IV	3–16	12.5	4.7	10.0	10.5	11.0	7.0	82	7	100	84	67	20
V	4–16	14.5	4.8	10.0	10.5	10.0	8.3	98	29	100	96	76	27
VI	4–16	15.6	5.0	11.7	11.0	11.5	8.7	99	43	100	98	80	33
VII	5–16	16.5	5.9	13.9	11.6	11.2	10.0	96	67	100	100	84	60
VIII	5–16	13.7	5.8	11.5	9.0	10.3	7.5	86	24	55	83	72	17
IX	5–16	12.0	5.7	8.1	11.0	12.0	9.3	94	57	100	90	80	50
X	4–16	12.0	4.5	9.0	11.0	11.3	6.3	93	25	70	100	90	20
XI	4–16	16.0	5.5	13.7	10.0	11.0	7.0	100	20	75	100	80	40
XII	1–17	12.0	4.0	6.0	8.0	7.0	5.0	92	44	100	100	75	9
XIII	2–17	13.0	5.0	10.0	9.5	12.0	7.0	94	20	85	90	65	35
XIV	4–17	15.8	5.2	11.0	10.6	11.3	9.0	88	47	100	98	82	25
XV	6–17	14.4	6.6	9.7	11.5	11.1	7.7	93	20	80	89	70	30
XVI	6–17	14.9	5.4	11.2	10.2	11.1	8.0	97	31	99	93	80	29
XVII	6–17	11.9	5.1	7.2	10.3	8.3	7.3	92	64	100	100	75	42
XVIII	3–17	18.2	6.8	16.0	13.7	12.5	12.7	100	82	100	100	91	67
XIX	.....	14.4	4.7	12.1	11.2	11.3	9.6	93	32	92	87	85	33
XX	4–16	14.7	5.7	10.5	8.8	11.1	.....	99	29	90	89	71	.....
XXI	4–16	19.0	6.7	22.0	11.7	11.4	10.0	99	60	96	96	92	30
XXII	4–16	11.4	5.0	7.0	7.8	9.5	6.0	93	10	90	85	70	20
XXIII	2–16	14.2	5.2	10.6	10.0	11.3	.....	100	72	100	100	88	.....
XXIV	5–16	16.8	6.4	11.7	12.4	12.4	8.3	98	45	91	97	76	35
Totals	.....	14.5	5.4	11.5	10.2	11.2	8.3	96	39	100	96	77	32
Pupils	.....	2,278	2,205	2,320	2,343	2,415	2,120	2,278	2,205	2,320	2,343	2,415	2,120

SECOND YEAR.

II	3–16	11.5	4.2	8.3	7.8	10.3	7.8	100	5	78	84	71	16
XV	6–17	14.7	5.5	10.5	11.0	12.0	7.0	95	15	93	94	70	30
Totals	.....	12.5	4.6	9.0	8.8	10.7	7 7	98	8	90	86	71	18
Pupils	.....	58	58	58	59	48	46	58	58	58	59	48	46

TABLE XXVI.

Comparing median Kansas scores with median Indiana scores.

TEST.	Indiana.		Kansas.	
	Speed.	Accuracy.	Speed.	Accuracy.
I	12.0	91	14.5	96
II	4.8	45	3.4	39
III	9.7	63	11.5	100
IV	11.0	82	10.2	96
V	11.3	69	11.2	77
VI	7.0	41	8.3	32

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